

Development Tools Handbook

Support
Solutions
for Intel's
Embedded
Microcomputers



MCS[®]-51 architecture



MCS[®]-96 architecture



80C186 architecture



Market Works

To Embedded Systems Developers:

Welcome to the first edition of the Intel Development Tools Handbook for the MCS[®]-51, MCS[®]-96, and 80C186 families of microcomputers. This Handbook is the result of a joint effort between Intel Embedded Microcomputer Division, Market Works, and over fifty suppliers of hardware and software development tools, products and services. The purpose of the Handbook is to provide a single, complete reference source of support solutions for the embedded systems developer.

For twenty years Intel Corporation has been the leader in providing microcomputers and development aids to the design engineering community. With the publication of the Development Tools Handbook Intel expands and consolidates its commitment to the engineering and design support marketplace.

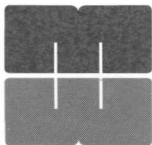
The Development Tools Handbook includes product descriptions and contact information for over 120 products from 56 companies. In addition to the Intel MCS[®]-51, MCS[®]-96 and 80C186 families of microcomputers the Handbook includes: peripheral components, prototyping boards, emulators, logic analyzers, programmers, compilers, assemblers, simulators, debugging tools, code analyzers, real-time operating systems, hardware/software consultants and training services. You can request additional information about the products and services listed here either by contacting the listed vendors directly, or by completing and returning the enclosed Reader Service Card.

Market Works and Intel Corporation are committed to making this Handbook as complete, accurate, and useful as possible. We hope that it facilitates your efforts to discover the products you need to complete your project quickly and efficiently. Your comments and suggestions to improve it are most welcome.

Thank you for your interest in the MCS[®]-51, MCS[®]-96, and 80C186 families of microcomputers and the support solutions listed here!

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Development Systems Product Manager
Intel Embedded Microcomputer Division*

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Market Works*



The Development Tools Handbook is published by:

Market Works

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 American Arium: EZ-PRO, ML4400
 Applied Microsystems Corporation: CodeTAP
 Archimedes Software: SimCASE-8051
 A.T. Barrett: RTXC
 B&C Microsystems, Inc.: PROTEUS104
 Borland International: Turbo C, Turbo Debugger, C++, TurboC++
 BP Microsystems: BP-1200
 BSO Tasking: CrossView, Trace 32, NetROM
 Cactus Logic: IDS/LC, Single Target Interface Unit
 CAD-UL: Organon, Organon XDB
 Ceibo: DS-186, DB-51, MP-51, DS-51
 Checkmate: C196K, C186
 ChipTools, Inc.: ChipView-51
 Cimetrix Technology: 9-Bit Solution, MLAN
 Concurrent Sciences, Inc.: Soft-Scope III, CSiMON, CSi-LINK
 Data I/O: PROMlink, Matchbook
 DEC: MicroVAX, VAX/VMS, VMS, DECStation, Ultrix
 EDI Corporation: SOCON, YUCON, Pin Monitors, MONICONS, Pin Isolators, ISOCONS
 Elan Systems: ZIFPAC
 Emulation Technology, Inc. Adapt-A Pod, Adapt-A-Clip, Adapt-A-Board and ETPQFP Test Clip
 Franklin Software: C51 Professional Developers Kit, C51, RTX51, RTX51 "Tiny", BL-51, dScope-51, LIB51, A51, MON51, ProView, TS51x, Target Scope 51, PK51, BL51
 Hewlett-Packard: HP64767 Series, HP9000, Series 300, 400 and 700
 HiTech Equipment Corporation: DryICE, DryICE Plus
 Hitex: teletest 51, teletest 16
 Intel: MCS-51, MCS-96, ICE, FaxBACK, Pentium
 International Business Machines Corporation: PC/XT, PC/AT, PS2, RS6000, PC-DOS
 Link Computer Graphics, Inc.: ALLPRO-88
 Logical Devices, Inc.: ALLPRO-88, Husky-1
 MetaLink Corporation: iceMASTER-8051, iceMASTER-PE 8051
 Metaware: High C
 Micro Computer Control: MICRO/C-51, MICRO/SLD-51, MICRO/ASM-51
 Microsoft Corporation: Microsoft C, CodeView, CV/TAP, Microsoft C++, DOS 2.1, DOS 3.0, DOS V3.3, MS-DOS, MS/Windows
 Microtek International, Inc.: MICE-IIIS
 MicroView: QUAL_bug XX
 Minato Electronics, Inc.: Model 1891, 1892 Compact Gang Programmers
 Motorola: S-records, 68HCII
 MJS/Lorimac: TC2000
 NEC: NEC PC
 Nohau Corporation: EMUL-51PC
 Noral Micrologics Ltd.: SDT-Xi
 Orion Instruments, Inc.: UniLab 8620, OmniLab 9000/9350, Mixed A/D, Clip-On
 Pacific Softworks: Fusion TCP/IP
 Phar Lap Software, Inc.: 386/ASM/LinkLoc, .EXP
 Signum Systems: SDT-XF, USD-51, USP-96
 Softaid, Inc.: UEM 80186
 Sophia Systems and Technology: Watchpoint, SA98
 Sun Microsystems: SUN 3, SUN 4, SPARC
 Systems and Software, Inc.: CV/Tools 86, CV/Steam 86
 Tektronix, Inc.: Centurion
 US Software: View Task, ProtoTask, MultiTask, GOFAST
 Vail Silicon Tools: ECAL
 WSI: PSD-Gold/PSD-Silver, MagicPro, WISPER, MAPLE, MAPPRO, WS6000 MagicPro
 Xilinx, Inc.: Xilinx
 Zilog: Zilog Z80, Z280, Z180, Z80

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Microcontrollers, Peripherals & Accessories

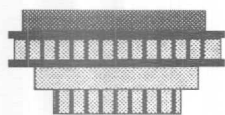
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Intel Processor Accessories

Accessories for All Intel Processors

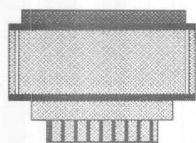
- ▶ Support for every Intel processor
- ▶ Support for all packages
- ▶ Modular and complementary designs

SOCON™ Socket Converters

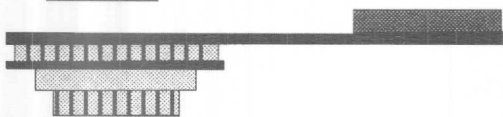


SOCONs permit an IC or an emulator pod with one type of footprint to be used in a socket or on a board designed for a different type of footprint. SOCONs also permit ZIF test sockets to be employed in a production socket to verify ASICs on known good motherboards.

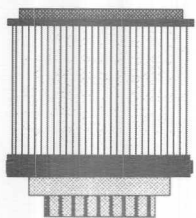
Socket Extenders and Extended Socket Converters



Socket extenders provide extra height for applications where neighboring components must be cleared. Extended socket converters provide a socket conversion function in addition to extension.

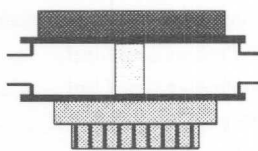


Extension Cables and Extension Boards



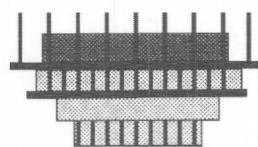
Extension cables (both ribbon cable and flexible board) and horizontal extension boards are accessories for in-circuit emulators. Flexible boards and rigid boards have ground planes to minimize crosstalk between the lines.

YUCON™ "You Connect" Wire Wrappable Socket Converters



YUCONs are user-customizeable socket converters. The top, or socket board, and the bottom, or plug board, contain wire wrap posts around the periphery to permit custom interconnection. YUCONs support most package types and are available in thousands of socket and plug combinations.

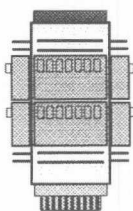
Pin Monitors™ and MONICONS™



Pin Monitors are accessories for logic analyzers. They have test posts on the periphery to permit signal monitoring, signal injection, and probe or cable attachment. MONICONS have monitoring posts

in addition to converting the target socket to accept a different type of package.

Pin Isolators™ and ISOCONs™



Pin Isolators accept a device under development and take its place in the target socket. Switches permit isolation of any pin on the IC in the socket from the rest of the board. They also permit signal injection, fault simulation, and probe or cable attachment. ISOCONs provide a socket-conversion function in addition to pin isolation.

Other Products

Programming adapters, test, prototyping, and logic analyzer accessories.

Contact

EDI Corporation
P.O. Box 366
Patterson, CA 95363
Tel: (209) 892-3270
Fax: (209) 892-3610

EDI Corporation

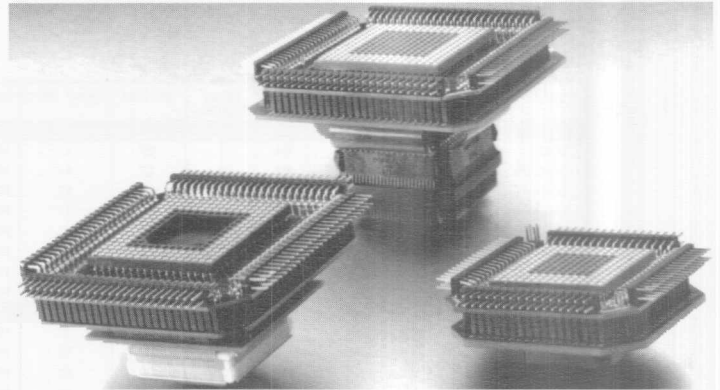
VLSI and SMT

VLSI and SMT
Adapters and Accessories

- ▶ Simplify your test setup
- ▶ Ask for clip-on, SMT, or socketable versions
- ▶ Support for 8031/51, 8086/88, 87C196MC, 80/83C196, N80C196KB/198, MCS®-96, 80186/88, 80C186, and 80C186/88EB devices
- ▶ Custom adapters available

Contact:

Joe Bagliere, VP Marketing
Emulation Technology, Inc.
2344 Walsh Ave., Bldg. F.
Santa Clara, CA 95051
Tel: (408) 982-0660
Fax: (408) 982-0664

**Product Information**

Emulation Technology offers a full line of development adapters and accessories used by engineers to test and debug today's most advanced surface-mounted chips.

In addition to making testing and debugging more efficient and convenient, these adapters and accessories eliminate the need for noisy cables and reduce the capacitance and inductance in your test setup.

Logic Analyzer Adapters

The Bug Katcher extends the leads and labels the signals of your IC, so you can easily attach test leads to it. This adapter fits between your device and its socket or surface-mount pad pattern, and accepts leads from logic analyzers and oscilloscopes.

Preprocessor Interfaces

Our passive preprocessors provide a complete interface between the IC in your target system and your Hewlett-Packard logic analyzer. These interfaces connect the signals from the IC directly to analyzer input channels, eliminating the time-consuming task of individually connecting each logic analyzer channel to the IC under test.

PQFP Test Clips®

The ET PQFP Clip allows for hands-free testing of surface-mounted PQFP devices. It provides hardware connection for testing, logic analysis, and emulation.

Emulator Tools®

The Adapt-A-Pod® and Adapt-A-Clip® convert your emulator pod to the footprint of your IC. They present your emulator, logic analyzer, or other test equipment with alternate female footprints.

Prototype Adapters®

Adapt-A-Boards make it easy to adapt standard or high-density prototyping boards to a variety of packages. Bottom configurations adapt to wire wraps or machine screw pins.

Ordering Information

- Call for a FREE catalog
- Delivery is 10 days ARO.
- Call factory for prices

Intel MCS[®]-51 Embedded Microcontroller Family

MCS[®]-51 Product Line Card

Product	ROM/EPROM	RAM	Timer/ Counters	I/O Pins	Speed (MHz)	Process	Package	Key Features
MCS[™]-48 Product Line								
8048	1 K ROM	64	1	27	11	HMOS	P	Boolean Processing
8035AHL	ROMless	64	1	27	11	HMOS	P	Boolean Processing
8049AH	2 K ROM	128	1	27	11	HMOS	P,N	Boolean Processing
8039AHL	ROMless	128	1	27	11	HMOS	P,N	Boolean Processing
8050AH	4 K ROM	256	1	27	11	HMOS	P,N,D	Boolean Processing
8040AHL	ROMless	256	1	27	11	HMOS	P,D	Boolean Processing
8748H	1 K EPROM	64	1	27	11	HMOS	P,D	Boolean Processing
8749H	2 K EPROM	128	1	27	11	HMOS	P,N,D	Boolean Processing
51XX Product Line								
8031AH	ROMless	128	2	32	12	HMOS	P,N,D	Boolean Processing
8051AH	4 K ROM	128	2	32	12	HMOS	P,N,D	Boolean Processing
8051AHP	4 K ROM	128	2	32	12	HMOS	P,N,D	Protected ROM
8751H	4 K EPROM	128	2	32	12	HMOS	D	One-Level Memory Lock
8751BH	4 K EPROM	128	2	32	12	HMOS	P,N	Two-Level Memory Lock
8052 Product Line								
8032AH	ROMless	256	3	32	12	HMOS	P,N,D	Three Timer Counters
8052AH	8 K ROM	256	3	32	12	HMOS	P,N,D	Three Timer Counters
8752BH	8 K EPROM	256	3	32	12	HMOS	P,N,D	Two-Level Memory Lock
C51BH Product Line								
80C31BH	ROMless	128	2	32	12,16	CHMOS	P,N,D,S	Power Save Modes
80C51BH	4 K ROM	128	2	32	12,16	CHMOS	P,N,D,S	Power Save Modes
80C51BHP	4 K ROM	128	2	32	12,16	CHMOS	P,N	Protected ROM
87C51	4 K EPROM	128	2	32	12,16,20,#	CHMOS	P,N,D	Three-Level Memory Lock
C51FX Product Line								
80C51FA	ROMless	256	3	32	12,16	CHMOS	P,N,D,S	Programmable Counter Array (PCA)
83C51FA	8 K ROM	256	3	32	12,16	CHMOS	P,N,D,S	Programmable Counter Array (PCA)
87C51FA	8 K EPROM	256	3	32	12,16,20,#	CHMOS	P,N,D,S	Programmable Counter Array (PCA)
83C51FB	16 K ROM	256	3	32	12,16,20,#	CHMOS	P,N,D,S	Programmable Counter Array (PCA)
87C51FB	16 K EPROM	256	3	32	12,16,20,#	CHMOS	P,N,D,S	Programmable Counter Array (PCA)
83C51FC	32 K ROM	256	3	32	12,16,20,#	CHMOS	P,N,D,S	Programmable Counter Array (PCA), Prog. Clock Out
87C51FC	32 K EPROM	256	3	32	12,16,20,#	CHMOS	P,N,D,S	Programmable Counter Array (PCA), Prog. Clock Out
C52/54/58 Product Line								
80C32	ROMless	256	3	32	12, 16, 20	CHMOS	P,N,S	Third Timer/Counter is UP/DOWN
80C52	8 K EPROM	256	3	32	12, 16, 20,#	CHMOS	P,N,S	Third Timer/Counter is UP/DOWN
87C52	8 K EPROM	256	3	32	12, 16, 20,#	CHMOS	P,N,D,S	Third Timer/Counter is UP/DOWN
80C54	16 K ROM	256	3	32	12, 16, 20,#	CHMOS	P,N,S	Third Timer/Counter is UP/DOWN
87C54	16 K EPROM	256	3	32	12, 16, 20,#	CHMOS	P,N,D,S	Third Timer/Counter is UP/DOWN
80C58	32 K ROM	256	3	32	12, 16, 20,#	CHMOS	P,N,S	Third Timer/Counter is UP/DOWN
87C58	32 K EPROM	256	3	32	12, 16, 20,#	CHMOS	P,N,D,S	Third Timer/Counter is UP/DOWN
C51GB Product Line								
80C51GB	ROMless	256	3	48	12,16	CHMOS	N	8-Channel 8-bit A/D, 2 PCA, 6 I/O Ports
83C51GB	8 K ROM	256	3	48	12,16	CHMOS	N	8-Channel 8-bit A/D, 2 PCA, 6 I/O Ports
87C51GB	8 K EPROM	256	3	48	12,16	CHMOS	N	8-Channel 8-bit A/D, 2 PCA, 6 I/O Ports
C152 Product Line								
80C152JA	ROMless	256	2	40	16.5	CHMOS	P,N	Multi-Protocol Serial
80C152JB	ROMless	256	2	56	16.5	CHMOS	N	Communication
83C152JA	8 K ROM	256	2	40	16.5	CHMOS	P,N	Power Save Modes 3x
C51SL Product Line								
80C51SL-BG	ROMless	256	2	87	16	CHMOS	S	4-Channel 8-bit A/D, Power Save Modes
81C51SL-BG	8 K *ROM	256	2	87	16	CHMOS	S	4-Channel 8-bit A/D, Power Save Modes
83C51SL-BG	8 K ROM	256	2	87	16	CHMOS	S	4-Channel 8-bit A/D, Power Save Modes
80C51SLAH	ROMless	256	2	87	16	CHMOS	KU	4-Channel 8-bit A/D, Power Save Mode, Host Interface
81C51SLAH	8 K *ROM	256	2	87	16	CHMOS	KU	4-Channel 8-bit A/D, Power Save Mode, Host Interface
83C51SLAH	8 K ROM	256	2	87	16	CHMOS	KU	4-Channel 8-bit A/D, Power Save Mode, Host Interface
87C51SLAH	8 K EPROM	256	2	87	16	CHMOS	KU	4-Channel 8-bit A/D, Power Save Mode, Host Interface
80C51SLAL	ROMless	256	2	87	16	CHMOS	SB	4-Channel 8-bit A/D, Power Save Mode, Host Interface, 3 Volt
81C51SLAL	8 K *ROM	256	2	87	16	CHMOS	SB	4-Channel 8-bit A/D, Power Save Mode, Host Interface, 3 Volt
83C51SLAL	8 K ROM	256	2	87	16	CHMOS	SB	4-Channel 8-bit A/D, Power Save Mode, Host Interface, 3 Volt
87C51SLAL	8 K EPROM	256	2	87	16	CHMOS	SB	4-Channel 8-bit A/D, Power Save Mode, Host Interface, 3 Volt

Key:

P = Plastic DIP

D = Ceramic DIP

N = PLCC

S = Quad Flat Pack (QFP)

*ROM = Denotes SystemSoft Standard BIOS

= 24 MHz (Internal Program Execution ONLY!)

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor.

For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*[™] document #2589.**Contact**

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Intel MCS[®]-96 Embedded Microcontroller Family

MCS[®]-96 Product Line Card

Device	ROM/ OTPROM	Register RAM	Code RAM	Timer/ Counters	Analog Input Channels	I/O Pins	I/O Type	Serial Ports	Speed (MHz)	Process	Pkg.	ONCE Test Mode	Adrs. Space	Key Features
8X9XBH	8 K	232	No	2	8	48	HSIO	1	12	HMOS	N, R, U, P, C	No	64 K	Low cost, 8/16-bit bus, register-to- register architecture
8X96	8 K	232	No	2	4	48	HSIO	1	12	HMOS	C, P	No	64 K	Lowest cost, 8-bit bus, 4 Channel A/D version of BH
8X9XJF	16 K	232	256	2	8	48	HSIO	1	12	HMOS	N, U	No	64 K	16K OTPROM, Internal (Code) RAM version of BH
8XC196KB/ 8XC196KB16	8 K	232	No	2	8	48	HSIO	1	10, 12, 16	CMOS	N, S, U	Yes	64 K	Low-Power, High Performance CMOS
8XC194/ 8XC198	8 K	232	No	2	0, 4	48	HSIO	1	16	CMOS	N, S	Yes	64 K	Lower-Cost, 8-bit Bus 0 or 4 Channel Version of KB
8XC196KC/ 8XC196KC20	16 K	488	No	2	8	48	HSIO	1	16, 20	CMOS	N, S	Yes	64 K	16K OTPROM, 488 Byte RAM 3-PWM, PTS
8XC196KD/ 8XC196KD20	32 K	1000	No	2	8	48	HSIO	1	16, 20	CMOS	N, S	Yes	64 K	32K OTPROM, 1K Byte RAM
8XC196MC	16 K	488	No	2	13	53	8 EPA	1 PTS	16	CMOS	N, S, U	Yes	64 K	PTS, PWM, 3-Phase Waveform Generator
8XC196MD	16 K	488	No	2	14	64	12 EPA	1 PTS	16	CMOS	N, S, U	Yes	64 K	MC Enhancement with Frequency Generator
8XC196KR	16 K	488	256	2	8	56	10 EPA	2	16	CMOS	N	Yes	64 K	10 EPA, 8 A/D, 56 I/O lines 16K OTPROM
8XC196JR	16 K	488	256	2	8	56	10 EPA	2	16	CMOS	N-52	Yes	64 K	6 EPA, 6 A/D, 52L package, more memory than JQ
8XC196KQ	12 K	360	128	2	8	41	6 EPA	2	16	CMOS	N	Yes	64 K	10 EPA, 8 A/D, 56 I/O lines 12K OTPROM
8XC196JQ	12 K	360	128	2	8	41	6 EPA	2	16	CMOS	N-52	Yes	64 K	6 EPA, 6 A/D, 52L package for cost sensitive applications
8XC196KT	32 K	1000	512	2	8	56	10 EPA	2	16	CMOS	N	Yes	64 K	Memory scalar version of KR with enhanced bus controller
8XC196NT	32 K	1000	512	2	4	56	10 EPA	2	16	CMOS	N	Yes	1 M	1M Byte Linear Address Range Memory Scalar Version of NQ
8XC196NQ	12 K	360	128	2	8	56	10 EPA	2	16	CMOS	N	Yes	1 M	1M Byte Linear Address Range Enhanced Bus Controller

Packages: C = 48L Ceramic DIP
N = 68L PLCC
P = 48L Plastic DIP

R = 68L Ceramic LCC
S = 80L QFP
U = 64L Shrink DIP

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*[™] document #2589.

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Intel 80C186 Embedded Microcontroller Family

80C186 Product Line Card

Device	Input Levels	Integrated Clock Generation	DMA Ch's	Timer/Counters	WDT	Chip Select Ready Logic	Chip Select Pins	I/O Pins	Integrated Interrupt Controller	SIO	Speed	Integrated Refresh Control Lines	Process	Pkg.	ONCE Test Mode	3V Part	Power Options
80186/ 80188	TTL	Yes	2	3	No	186 Style	13	0	Yes	0	8	No	HMOS	A, N, R, S	No	No	
80C186/ 80C188	TTL	Yes	2	3	No	186 Style	13	0	Yes	0	10, 12.5, 16	Yes	CHMOS	A, N, R, S	Yes	No	Powersave
80C186XL/ 80C188XL	TTL	Yes	2	3	No	186 Style	13	0	Yes	0	10, 12.5, 16, 20	Yes	CHMOS	A, N, R, S	Yes	No	Powersave, Static
80C186EB/ 80C188EB	CMOS	Yes	0	3	No	Enhanced	10	16	Yes	2	8, 13, 16, 20	Enhanced	CHMOS	N, S	Yes	No	Powerdown, Idle, Static
80C186EA/ 80C188EA	CMOS	Yes	2	3	No	186 Style	13	0	Yes	0	12.5, 16, 20	Yes	CHMOS	N, S	Yes	No	Powersave, Powerdown, Idle, Static
80L186EB/ 80L188EB	CMOS	Yes	0	3	No	Enhanced	10	16	Yes	2	8, 13	Enhanced	CHMOS	N, S	Yes	Yes	Powerdown, Idle, Static
80L186EA/ 80L188EA	CMOS	Yes	2	3	No	186 Style	13	0	Yes	0	8, 13	Yes	CHMOS	N, S	Yes	Yes	Powersave, Powerdown, Idle, Static
80C186EC/ 80C188EC	CMOS	Yes	4	3	Yes	Enhanced	10	22	Yes	2	13, 16	Enhanced	CHMOS	KU, S	Yes	No	Powersave, Powerdown, Idle, Static

Packages: A = 68L pin grid array

KU = 100L PLCC quad flatpack (JEDEC)

N = 68L PLCC (Except EB=84L PLCC)

R = 68L LCC (Ceramic)

S = 80L quad flatpack (EIAJ)

(except EC=100L QFP)

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

Ordering Information

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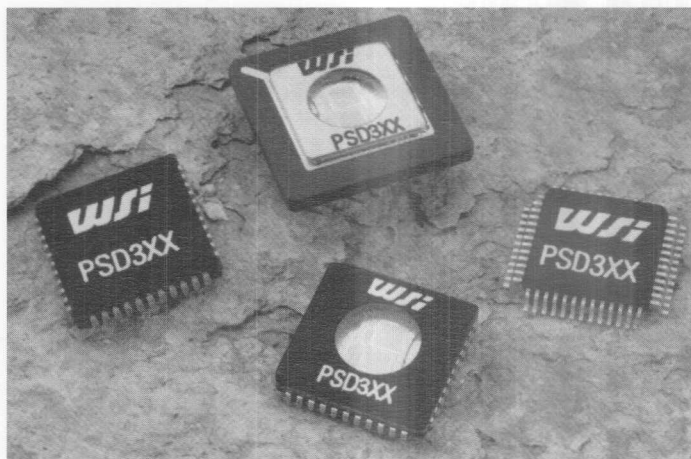
PSD3XX Family

PSD3XX Family of Programmable Microcontroller Peripherals

- ▶ Single-chip programmable peripheral for microcontroller applications
- ▶ 256 K/512 K/1 Mb EPROM, 16 Kb SRAM
- ▶ On-board programmable address decoder for memory mapping
- ▶ 19 individually configurable I/O pins (bus, chip selects, etc.)
- ▶ 6 CMOS devices in the family, all pin-compatible
- ▶ 120 to 200 ns access time
- ▶ Configurable microcontroller interface; works with them all
- ▶ Selectable X8 or X16 bus operation
- ▶ Alternately sourced by Philips Semiconductors
- ▶ Fully supported by Data I/O
- ▶ Production quantity pricing under \$7

Contact

WSI
47280 Kato Road
Fremont, CA 94538
Tel: (510) 656-5400 or (800) 832-6974;
(800) 562-6363 (in California)
Fax: (510) 657-8495

**Product Information**

Each member of the PSD3XX family is a single-chip, field-programmable CMOS circuit that integrates all the required microcontroller peripheral memory and logic elements for an embedded-control design. Programmable logic, page logic, programmable I/O ports, address mapping, port address and data tracking, EPROM, SRAM, and microcontroller port reconstruction are all on-board. An internal security bit protects the device configuration from unauthorized copying. One PSD3XX eliminates up to ten individual chips and dramatically cuts system development time and cost. A low-cost microcontroller (i.e., 80C31, 80C196, etc.) and a PSD3XX device form the most cost-effective solution for a simple, but very powerful, embedded-control system core.

WSI's PC-based, menu-driven PSD-Gold or PSD-Silver system development tools are inexpensive and easy to use. The MagicPro programmer included in the PSD-Gold provides quick prototyping and rapid system development.

Ordering Information

For literature, pricing, and availability, call or fax us to find the sales office nearest you.



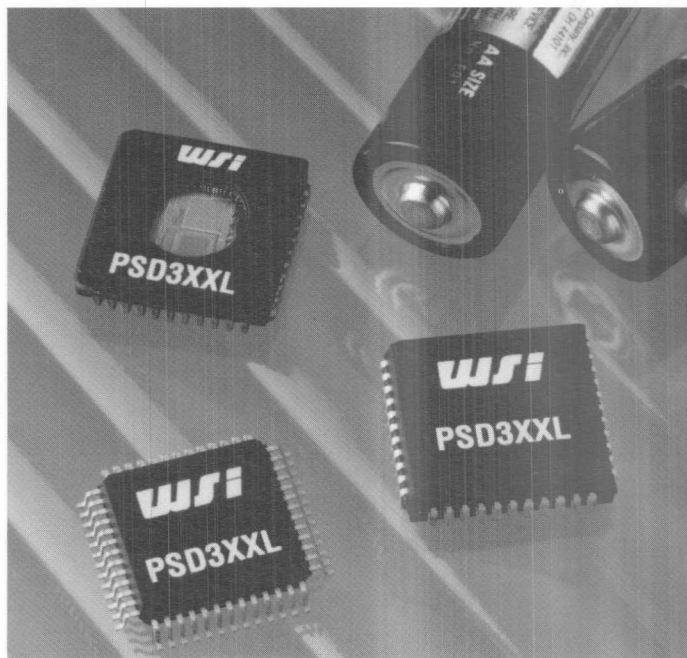
PSD3XXL Family

PSD3XXL Family of
3-Volt Programmable
Microcontroller Peripherals

- ▶ Single-chip programmable peripheral for microcontroller applications
- ▶ 3.0 to 5.5 volt operating range
- ▶ Typ. 6 ma operating, 1 μ a standby
- ▶ 256 K/512 K/1 Mb EPROM; 16 Kb SRAM
- ▶ On-board programmable address decoder for memory mapping
- ▶ 19 individually configurable I/O pins (bus, chip selects, etc.)
- ▶ 6 CMOS devices in the family, all pin-compatible
- ▶ 250 to 300 ns access time
- ▶ User-configurable microcontroller interface
- ▶ Selectable X8 or X16 bus operation
- ▶ Alternately-sourced by Philips Semiconductors
- ▶ Fully supported by Data I/O

Contact

WSI
47280 Kato Road
Fremont, CA 94538
Tel: (510) 656-5400 or (800) 832-6974;
(800) 562-6363 (in California)
Fax: (510) 657-8495

**Product Information**

Each member of the 3.3-volt PSD3XXL family is a single-chip, field-programmable CMOS circuit that integrates all the required microcontroller peripheral memory and logic elements for an embedded-control design. Programmable logic, page logic, programmable I/O ports, address mapping, port address and data tracking, EPROM, SRAM, and microcontroller port reconstruction are all on-board. An internal security bit protects the configuration from unauthorized copying. One PSD3XXL eliminates up to ten individual chips and dramatically cuts system development time and cost. A low-voltage microcontroller (i.e., 80C31, 80C196, etc.) and a PSD3XXL device form the most cost-effective solution for a simple, but very powerful, low-voltage embedded-control system core.

WSI's PC-based, menu-driven PSD-Gold or PSD-Silver system development tools are inexpensive and easy to use. The MagicPro programmer included in the PSD-Gold provides quick prototyping and rapid system development.

Ordering Information

For literature, pricing, and availability, call or fax us to find the sales office nearest you.



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C-8051

C-8051 Cross-Compiler Kit

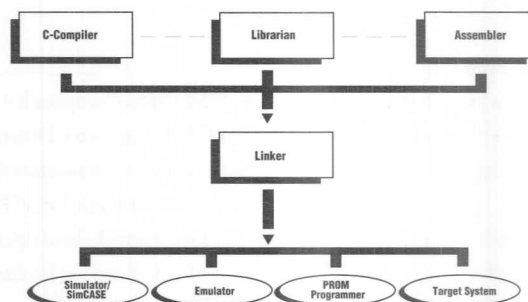
- ▶ ANSI-standard C cross compiler
- ▶ Extended keywords specific for MCS-51
- ▶ Multiple memory models supporting single-chip to banked designs with up to 8 MB of code
- ▶ STATIC and REENTRANT code (V5.0) supported by all memory models
- ▶ Memory-specific and generic pointers to maximize code speed (V5.0)
- ▶ Efficient parameter passing in registers (V5.0)
- ▶ Support for 10 data types and up to 32768 external references
- ▶ Extended C library (80+ functions) with full floating-point support
- ▶ Easy and fast interrupt handling directly in C
- ▶ HLL and symbolic debugging capabilities
- ▶ Built-in global optimizer generating highly efficient code

Contact

Archimedes Software, Inc.
2159 Union St.
San Francisco, CA 94123
Tel: (415) 567-4010
Fax: (415) 567-1318



ARCHIMEDES
SOFTWARE



Product Information

Archimedes Software was the first company in the U.S. to introduce the PC-based ANSI C Cross Compiler for the Intel 8051 family back in 1986. Since then, Archimedes Software has dedicated itself to the microcontroller software market and has developed a unique competence in C-compiler construction for embedded applications. In addition, Archimedes offers you one of most responsive technical and customer hot lines in the industry.

Complete Software Solution

The Archimedes Microcontroller C Kit includes all the software you need to produce efficient and reliable object code: C cross compiler, linker, librarian, C libraries, and a macro-assembler.

C Compiler

The Archimedes C Cross Compiler implements the full ANSI C language, making Archimedes compatible with standard C compilers such as Microsoft C and Borland Turbo C. It uses all 8051 features and generates optimal code competitive with hand-written assembly.

Macro-Assembler for Time-Critical Code Sections

The relocatable macro-assembler provides the versatility of coding time-critical sections in assembly. The macro-assembler translates symbolic assembly language mnemonics into relocatable object code where utmost speed, small code size, and precise hardware control are tightly critical.

C Libraries

The C Compiler comes with the most important C run-time library functions for stand-alone microcontroller applications. The low-level library routines, such as putchar() and getchar(), are provided in source-code form to make them adaptable to various hardware configurations.

Linker and Librarian

The linker supports complete linking, relocation, and format generation to produce PROMable code. The linker generates over 30 different output formats that can be downloaded to any of the most popular emulators or PROM programmers on the market. Some of the output formats supported are AOMF8051, Intel hex, Tektronix hex, Motorola S-records, and more. The librarian XLIB creates and maintains relocatable libraries.

Host Systems Supported

IBM PC and compatibles; HP 9000 series 300, 400, and 700; Sun 3; Sun 4 (SPARC); MicroVAX/VMS; and VAX/VMS

Warranty and Support

A 30-day money-back guarantee and lifetime telephone support are provided to all Archimedes users at no extra cost.

Ordering Information/Questions

- Call (800) 338-1453.
- MasterCard and Visa are accepted.

Sim8051PC

SimCASE
Simulator/Debugger

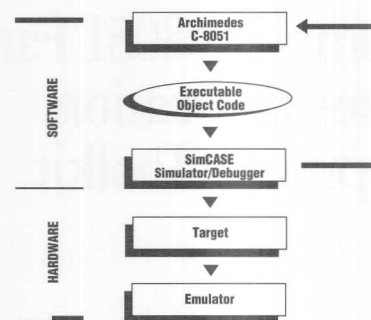
- ▶ Window-based operation to debug ASM, PL/M, or C
- ▶ Single and automated stepping
- ▶ Code/data breakpoints
- ▶ Execution tracing
- ▶ Memory examine
- ▶ Assembler/C toggle
- ▶ Variable watchpoints
- ▶ Stimulus I/O mapping
- ▶ Reverse single stepping
- ▶ Command files
- ▶ Performance analysis

Contact

Archimedes Software, Inc.
2159 Union St.
San Francisco, CA 94123
Tel: (415) 567-4010
Fax: (415) 567-1318



ARCHIMEDES
SOFTWARE

**Product Information**

Archimedes SimCASE integrates a microcontroller simulator, C and PL/M source debugger, assembler debugger, performance analysis tool (PAT), and input stimulus generator (ISG) into a single powerful software program.

Simulator

The simulator engine at the heart of SimCASE-8051 is a completely accurate model of the microcontroller device, including instruction set, timers, interrupts, I/O ports, and serial channels. SimCASE has built-in support for popular proliferation chips, including data capture and A-D. You compile, link, and load your object files into SimCASE just as you do on your target system. All code and data memory configurations are supported. Execution speed on the PC is at about one-fiftieth of real-time.

Performance Analysis Tool (PAT)

The performance analysis tool analyzes and displays an execution histogram of the program at the function, line, module, or instruction level. You can tell at a glance which sections of code cause the speed bottlenecks.

C, PL/M, and Assembler Debug

Use SimCASE to debug at the level you do your programming: ASM, PL/M, or C. You get unlimited control and visibility into the processor status as your C, PL/M, or assembly code executes.

On-chip I/O Testing

The input stimulus generator (ISG) allows you to supply an ASCII file of data values to any 8051 I/O port of address to verify code response to simple inputs. You can also save any outputs in an 8051 output file to verify I/O activity.

Host Systems

IBM PC or compatibles with at least 640 Kbytes of RAM using MS-DOS 2.1 or later.

Warranty and Support

A 30-day money-back guarantee and lifetime telephone support are provided to all Archimedes users at no extra cost.

Ordering Information/Questions

- Call (800) 338-1453
- MasterCard and Visa accepted

C 8051 Tools

The Complete 8051 Family Software Application Development Toolkit

- ▶ Highly optimized ANSI C compiler package producing the tightest, fastest code in the industry, bar none!
- ▶ Powerful macro assembler/linker generates ROMable, relocatable, and re-entrant code for optimum flexibility.
- ▶ GUI-based, multiwindow debugger for simulation, target ROM, and I.C.E. debugging in C, assembly, or PL/M.
- ▶ Intel standard OMF51, C, and assembly language are all supported. IEEE695 object format produced with complete symbolic debug information.
- ▶ Complete ANSI C library and run-time support, including I/O calls, memory management, string handling, and floating-point math. C libraries are all delivered in source code.
- ▶ Support for all 8051 derivatives—100+!

Contact

BSO/TASKING World Headquarters
333 Elm Street
Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

Call (800) 458-8276 for detailed product information.

**BOSTON
SYSTEMS
OFFICE
TASKING**



Product Information

Established in 1974, BSO/TASKING pioneered the concept of cross-development on DEC computer systems. Today, BSO/TASKING has 120 dedicated individuals who are focused on high-quality solutions for the embedded systems developer. Our products and services are for professional engineers who cannot compromise the quality of their own product designs with marginal tools.

Customer satisfaction comes first at BSO/TASKING. We provide a toll-free hot line for ordering products, asking technical questions, and reporting problems. Our 8051-based products include a 90-day warranty. Comprehensive technical support can be continued by enrolling in our Product Maintenance Plan, which guarantees you all future releases such as product updates and feature enhancements. *Ask our competitors what they charged for their last update!*

Host Availability

- PC-DOS
- Sun SPARC
- Sun 3
- DEC VAX (VMS or Ultrix)
- DECStation
- IBM RS6000
- HP9000
- NEC PC

I.C.E. Integration

- Ceibo
- Lauterbach
- Nohau
- Intel
- Metalink
- Orion
- HMI
- HP
- Hitex
- Dr. Krohn and Stiller

C 8051 Tools

The Complete 8051 Family Software Application Development Toolkit

- ▶ Full ANSI-standard C compiler generating extremely efficient, fast, and reliable Intel compatible assembly code
- ▶ Interrupt service routines can be written in C or assembly for the best performance
- ▶ Support for in-line assembly programming and in-line expansion of predefined functions
- ▶ Highly efficient IEEE single-precision floating-point math support
- ▶ Many utilities included: librarian, cross reference generator, and the object code conversion utility
- ▶ High-performance function overlaying by the linker reduces the amount of allocated on-chip RAM significantly
- ▶ Support for four memory models: small, auxpage, large, and re-entrant

Contact

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Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

Call (800) 458-8276 for detailed product information.

BOSTON
SYSTEMS
OFFICE
TASKING

Product Information

One supplier, one support hot line, one company...

BSO/TASKING software products are developed with great care at our innovative "Software Factory." It is a fully integrated environment for software development, modeled after and compatible with the standards defined in the ESPRIT Project PCTE (Portable Common Tool Environment). This paradigm facilitates the creation of tools that execute in multiple environments (DOS, UNIX, and VMS) from a single master source file that is then verified with the Plum Hall Test Suite.

ANSI C and C++ compilers, macro assemblers, locating linkers, ROM target, I.C.E. based and simulator debuggers are built, tested, and verified to ensure link-compatible, multiplatform development.

Software Products

- 8051 Family ANSI C Compiler Package
Includes an ANSI C compiler, macro assembler, linker, locator, format utility, cross-reference utility, complete run-time library package with all C functions provided in source code, and a powerful librarian.
- 8051 Family Debugging System—ChipView
Includes a multiwindow, GUI-based user interface that communicates to three individual debugging environments: a simulator, a target ROM monitor, or an I.C.E. system. One product, one user interface, three ways to debug!

Hardware Products

- ESS32 8051 EPROM Simulator Debugger
A low-cost debugging system that provides internal access to simulation memory in real time. Also provides a high-level trace debugging facility for C and assembly language debugging.
- Trace 32 8051 In-Circuit Emulation System
A universal development system with the most advanced emulation capabilities available. Trace 32 I.C.E. for 8051 provides in-circuit emulation, logic state and timing analysis, simulation, performance analysis, a universal device programmer, data comm analysis, and many more features simply not available in other systems. Trace 32 is truly in a class by itself.

Product Availability

Software products and interfaces to hardware systems are available on:

- PC-DOS
- Sun SPARC
- Sun 3
- DEC VAX (VMS and Ultrix)
- DECStation
- IBM RS6000
- HP 9000
- NEC PC

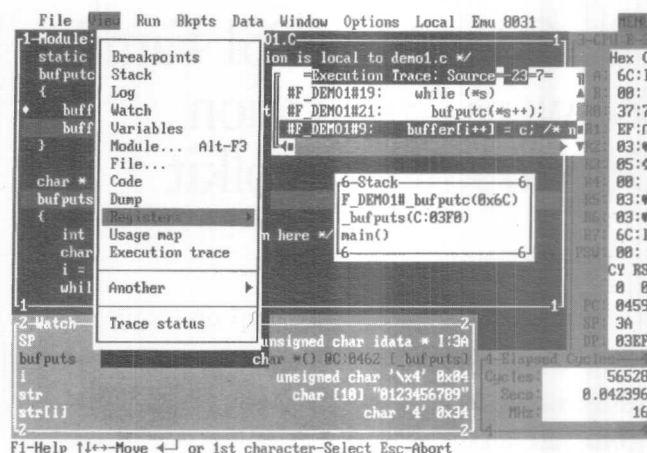
ChipView-51

ChipView®-51 High-Level/Low Level Debugger

- ▶ No learning curve—ChipView-51 is key-compatible with Borland's popular Turbo Debugger
- ▶ High-level support for C compilers and PL/M and assemblers from Archimedes, Franklin, IAR, Intel, Keil, and BSO/Tasking
- ▶ Point and click to toggle breakpoints, or to watch or inspect C expressions with a mouse, menus, or hot keys
- ▶ C-Level Debug displays C Call Stack and C data browsers with full variable data type and scope information
- ▶ Fully interactive VGA+ Windows—over 14 different views can be overlapped, moved, and resized
- ▶ One-key 'Build' launches the edit-recompile-reload loop and on return totally restores user's debug context
- ▶ Three engines behind a common user interface support all phases of design and testing: high-speed simulator, emulator, and ROM monitor

Contact

ChipTools Inc.
1232 Stavebank Road
Mississauga, Ontario
Canada L5G 2V2
Tel: (416) 274-6244
Fax: (416) 891-2715



Product Information

The ChipView-51 debugger lets you move from Turbo C to debugging 8051 embedded C instantly, as it is key-compatible with Borland's popular Turbo Debugger. It is available with a high-performance simulation engine, a ROM monitor engine, or interfaced for popular 8051 emulators.

ChipView-51 is the only 8051 debugger to support all popular 8051 C compilers at high level. Unlike debuggers that support only simple data types, ChipView-51 lets you browse through C structures, unions, enumerations, bitfields, pointers, and arrays. All compiler generated debug information is utilized with complete types and scoping on all tags and names so you see variables just the way you wrote them. With ChipView-51, you can simply point and click your way along a linked list.

ChipView-51's high-performance simulator engine achieves the real-time speed of a 12-MHz 8051 when run on a 33-MHz 486 PC. It is ideal for testing entire programs before the target hardware is ready.

The emulator version is tailored to fully support Nohau's standard trace and emulator boards, and provides the extra power to trace up to 16 K of source lines, mixed with a full trace of selected functions, chosen by point and click!

Ordering Information

- CV51-S ChipView-51 High-Performance Simulator
- CV51-M ChipView-51 ROM Monitor Debugger
- CV51-NOH ChipView-51 Nohau Emulator Debugger
- CV51-C ChipView-51 COMBO Package of all

Call for a Free Working Demo.

Support

- MS-DOS, OS/2, Windows 3.x, Desqview
- IBM AT or compatible, 640K RAM + EMS or XMS
- 8052, 8xC51Fx + popular derivatives
- Custom version for Nohau EMUL51-PC
- High-level support for C compilers from Archimedes, BSO/Tasking, Franklin, IAR, and Keil.
- Source-level support for Assemblers and PL/M-51 compilers from Intel. Others supported at OMF51.

Warranty

All ChipTools products have a 30-day money-back guarantee and one year of free updates and technical support to registered users.

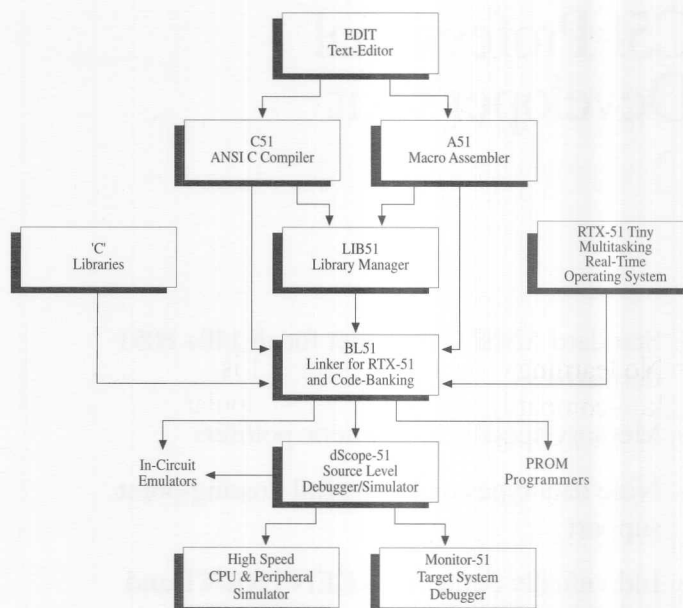
C51 Professional Developer's Kit

- ▶ Graphical user interface with pop-up menus and dialog boxes
- ▶ High-level language and symbolic debugging capabilities
- ▶ Full mouse support (debugger/simulator)
- ▶ Code banking linker supports up to 1MB
- ▶ Full C language support for multitasking kernel
- ▶ Extended C library and library manager
- ▶ Compact, high-performance RTX kernel designed for the 8051
- ▶ Compact target monitor and monitor interface to PC
- ▶ Full support for Hitex, Intel, and Nohau 8051 emulators
- ▶ Full support for re-entrant code, mix re-entrant and non-reentrant code
- ▶ Mixed memory models to minimize CPU cycles and code space

Contact

Franklin Software, Inc.
888 Saratoga Avenue, #2
San Jose, CA 95129
Tel: (408) 296-8051
Fax: (408) 296-8061

Franklin Software, Inc. is the exclusive distributor for Keil Software in North and South America, Africa, India, Asia, and the Pacific Rim countries.



Company History

Franklin Software, Inc., was formed in the late 1980s to provide the first truly useful cross-development tools to the 8051 embedded-systems market. Our premise was simple and—apparently in this industry—unique: Provide powerful, high-quality, easy-to-use products for the embedded system developer.

In 1992, Release V the “Professional Edition” was introduced in response to requests by leading 8051 developers for a tool set designed specifically to meet their complex and professional internal manufacturing needs.

Contact

Keil Elektronik GmbH.
Bretonischer Ring 15
D-8011 Grasbrunn b. München
Tel: (089) 46 50 57
Fax: (089) 46 81 62

Keil Elektronik GmbH is the exclusive distributor for Franklin Software in Europe, the near East, the mid East, and the Baltic



C51 Professional Developer's Kit

- ▶ Standard ANSI C compiler for all 140+ 8051 derivatives
- ▶ Memory-specific and generic pointers
- ▶ Nine data types including full floating-point support
- ▶ Individually definable REENTRANT and INTERRUPT functions
- ▶ Direct register variables and register-based parameter passing
- ▶ Complete C library with full ANSI, math, string handling, and I/O routines

Product Information

For 1993 the new C51 Professional Developer's Kit (PK51) has been redesigned to meet the exacting needs of the professional embedded-systems development engineer. It is a complete software development package and contains all the tools necessary to effect efficient and reliable software design: a C compiler; a macro assembler; a linker and utilities for code banking; a multi-tasking real-time operating system; and a powerful source-level debugger complete with simulator, monitor, and emulator interfaces. This kit is designed expressly for the professional user. It is our top-of-the-line offering!

Contact

Franklin Software, Inc.
888 Saratoga Avenue, #2
San Jose, CA 95129
Tel: (408) 296-8051
Fax: (408) 296-8061

Franklin Software, Inc. is the exclusive distributor for Keil Software in North and South America, Africa, India, Asia, and the Pacific Rim countries.



The Franklin C51 compiler offers a way to program in C that truly matches assembly programming in code efficiency and speed. Franklin C51 is not a universal C compiler adapted for the 8051. It is a dedicated 8051 C compiler that generates extremely fast and compact code. Embedded applications with the 8051 device family are developed more quickly with Franklin C51 than ever before.

A51 Macro Assembler 4.6

The A51 macro assembler version 4.6 is the latest version in our solid line of 8051 program development tools. Beginning with the Intel AEdit-like Edit program, you can create original 8051 program code for translation with the A51 macro assembler. You can write absolute or relocatable code, build it into libraries of procedures, or link it and convert it to Intel hex code and download it into a PROM burner to generate complete 8051 programs. The Shell, a command-line syntax checker, helps the user by prompting for correct command syntax. This results in efficient and effective use of your time and yields error-free code.

Scope of Delivery

- A51 Macro Assembler version 4.6.
- L51 Overlay Linker/Locator version 2.8.
- LIB51 Library Manager version 2.0.
- OHS51 Object to hex File Converter version 1.4.
- Shell, a DOS and command-line support program, version 2.0
- Edit Full Screen Text Editor version 1.01.

RTX51 Tiny is an abbreviated version of RTX51 and supports round-robin task scheduling. RTX51 Tiny is powerful and capable enough to meet most project requirements. Requiring less than 800 K of Code space, it runs exceptionally well on single-chip 8051s and has no explicit requirement for XDATA memory. RTX51 Tiny is delivered as a library and an include file and is a part of the Professional Developer's Kit. RTX51 Tiny source is shipped as part of the RTX51 Developer's Kit.

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BL51 Code Banking Linker

- ▶ Manage up to 16 Banks plus common area
- ▶ Automatic insertion of jump vectors to code banks
- ▶ Completely compatible with Franklin C51, A51 and Intel PL/M-51 modules
- ▶ Very fast switching (50 cycles)
- ▶ Support RTX51 Real Time Operating System
- ▶ Minimal stack and memory overhead
- ▶ Supports a wide range of bank switching hardware and software schemes

Overview

The new BL51 banked linker is a CODE bank-switching linker that allows 8051 program development where code requirements exceed the natural 64K addressing limit of the 8051 family of microcontrollers.

BL51 comes complete with a flexible configuration file that can be used to adapt to a wide variety of bank-switching hardware and software schemes.

Function

The BL51 manages a common area and up to a maximum of 16 code banks. The designated common area can be accessed by all banks. Code destined for the common area can be duplicated in each bank if the hardware is not designed for a common area, or if the common area of the hardware in use is too small. Among those code sections typically relegated to the common area(s) are:

- RESET and INTERRUPT VECTORS
- CODE constants
- INTERRUPT function code
- Bank-switch code and the associated jump table
- Intrinsic library functions

BL51 automatically generates and inserts a jump vector for program calls to different code memory banks. BL51 analyzes the complete application program and inserts inter-bank or intra-bank jumps only when this is *really* necessary. Compared to other less-elegant solutions, memory and stack overhead is truly minimal.

The actual functioning of the bank-switch logic is controlled by external hardware and is configured in a file provided for that purpose. In this manner, all forms of bank selection logic and hardware are conveniently and easily supported.

BL51 is completely compatible in function and invocation with L51. No recompilation or reassembly is necessary when using BL51. All existing C51, A51, and PL/M-51 modules can be linked without retranslating existing programs or libraries. This makes BL51 the ideal tool for generating programs that were previously restricted to the 64-K address space of the 8051.

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Contact

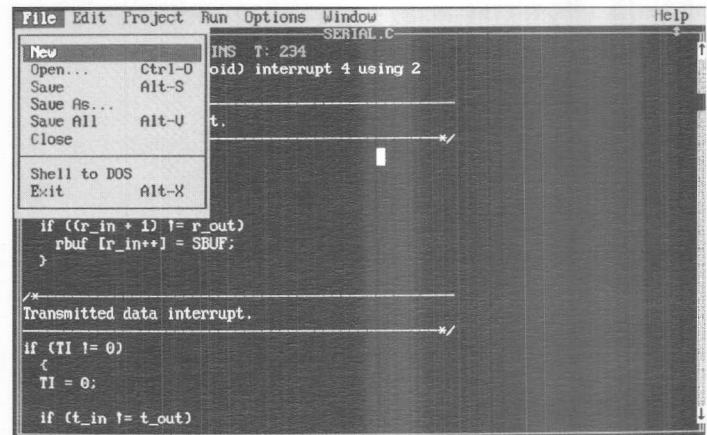
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Fax: (089) 46 81 62

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ProView: Turbo Tools

ProView: Turbo Tools for 8051 C!

- ▶ Complete turbo development capabilities for 8051 embedded system development
- ▶ The windowing system integrates all current Franklin tools with each other, and Intel and Nohau 8051 in-circuit emulators
- ▶ The window-oriented user interface offers a configurable full-function editor, program and object file management, pull-down menus, dialog boxes, and a comprehensive tools menu
- ▶ The interface provides full-screen interactive turbo editor for both source and object files
- ▶ Editing functions are available during debug sessions
- ▶ The ProView editor allows instant hot-key switching between ASCII text and hex object code, and manages and scans an "Error" list keyed to the line of source code that generated each error
- ▶ Turbo project management automates the compilation and production of loadable modules
- ▶ The system checks date and time stamps on all source and object files associated with a "Target"
- ▶ Changed modules are automatically recompiled, or assembled and linked before making a new loadable target

**Product Information**

Pull-down menus and dialog boxes access and manage editor, tools, projects, and targets.

Multiple display windows offer pull-down menu bar and user-controlled or default color selection, window sizing, and access to all files and tools.

The familiar turbo development capabilities speed your 8051 products to market, with automated "Project" control to minimize version-control housekeeping.

Automated "Make" capability reduces code base management and recompilation time and effort.

The windows-like interface integrates 8051 hardware and software development tools within efficient symbolic user interface which does not require Microsoft Windows to operate.

Self-installation provides fast start-up for this powerful user interface.

Contact

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(continued) 

ProView: Turbo Tools

(continued)

Product Information

Our all-new ProView provides a powerful Turbo C environment for the industry's most powerful 8051 development tools.

ProView enhances your Franklin 8051 development software with a familiar Turbo C-like user interface and mouse controls.

Use your mouse to access pull-down menus and pop-up dialog boxes. These provide a simple, direct means to control both the development process and view the results. At the heart of ProView is a powerful configurable new editor. This editor is integrated with Franklin's 8051 development tools to manage target code production.

ProView's configurable window environment is instantly familiar to C programmers experienced with Turbo C. The Brief-like editor uses smoothly integrated windows and pull-down menus to link our 8051 C compiler (version 3.2) and libraries, DS51 high-level language debugger/simulator (version 5.01), A51 macro assembler, L51 linker, and TS51 target monitor in a fast, sophisticated, configurable, yet easy-to-use mouse-oriented graphical environment.

ProView organizes 8051 development activities and resources around the concept of a "project." A project lists each source file (C or assembler), associated objects, and loadable target files in a project file. ProView tracks *include* files and manages and automates the software production process, comparing the date and time stamps of each source file with its object file and checking for consistency. ProView automatically calls the compiler or assembler as needed for those files that have been changed, and then re-links them to generate a new load module. At last, no more messy, difficult to understand and maintain "makefiles"!

ProView requires version 3.20 or later of the C51 compiler, and version 5.01 or later of the DS51 debugger/simulator. It completely integrates all of our 8051 tools, including the C51 compiler, DS51 debugger/simulator, A51 macro assembler, L51 linker, BL51 linker, Lib51 librarian, other utilities, and both Intel and Nohau in-circuit emulators (if available). Special pop-up dialog boxes enable you to add tools and define a wide variety of operational parameters. ProView is completely transparent to all supported hardware and software tools. Contact us to inquire about availability of support for additional vendors' 8051 hardware or software tools.

ProView runs on IBM compatible PC/AT's running Microsoft or PC-DOS 3.0, with an 80286/386/486 processor and at least 512 K of RAM. An EGA or VGA graphics controller and display is required. ProView is completely compatible with 8051 software tools from Keil Elektronik GmbH.

ProView (PV51) is available for immediate delivery at PV51, Franklin product number 3070, and comes complete with all documentation on a single 1.2-MB floppy diskette.

Specifications and Requirements

- Hardware:
 - IBM PC-AT or compatible
 - DOS 3.0 or later
 - 512 K of RAM
 - EGA or VGA graphics adapter
 - Hard-disk drive
- Software:
 - C51 version 3.20 or later (required)
 - DS51 version 5.01 or later (required)

Contact

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dScope-51

dScope-51 Source-Level Debugger

- ▶ Window-oriented user interface displays :
 - Command input and output
 - Source and assembler text and trace buffer
 - CPU registers
 - Watch variables
 - Serial communication
- ▶ Extensive break capabilities
- ▶ Simple command entry with:
 - Mouse
 - Command line
 - Pull-down menus
 - Function and cursor keys
- ▶ Full debug information with object types
- ▶ High-speed simulation
- ▶ Interface and control for Intel, Hitex, and Nohau emulators

Contact

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```
Options Key View Peripheral Map Help CPU Trace Register
217: TMOD = TMOD | 0x02: /* select mode 2
218: TR0 = 1: /* start timer 0
219: ET0 = 1: /* enable timer 0 interrupt
220: EA = 1: /* global interrupt enable
221:
222: clear_records (); /* initialize circular buffer
223: printf (menu); /* display command menu
224: while (1) { /* loop forever
225: printf ("\nCommand: ");
226: getline (&cmdbuf, sizeof (cmdbuf)); /* input command line
227:
Language Module: MEASURE.C
>rec cmdbuf
f:0069H = 0x00 "T 12:10:25\n"
f:0075H = 0x00
>save_record (sindex++1.time.hour=3
save_record (sindex++1.time.hour=3
>mcommand.set_interval.second
0:0x4B = 0
>obj cmdbuf
"T 12:10:25\n0\n0\n0\n0"
>asm #222
>Exe
<assemble start address>
```

Product Information

dScope-51 is a source-level debugger for C51 and PL/M-51. It is both a powerful simulator and a target debugger. The complete package contains a debugger, a simulator, a monitor, and an emulator interface.

dScope-51 can simulate the whole 8051 CPU, including peripherals of most 8051 derivatives. A C like macro language adds the capability to simulate a wide variety of complex input signals or external I/O functions.

The MON51 Monitor considerably expands the capability of dScope-51 with its direct interface to target hardware. In addition, the sophisticated user interface of dScope-51 can be used with many popular emulators.

Contact

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TS51 Target Scope Emulator Interface

- ▶ "Windowing" for your tools
- ▶ "Self Installing" for fast startup
- ▶ Mouse control speeds work
- ▶ Multiple window display for variables, source, object, and breakpoints speeds debugging
- ▶ Easy to use—comes with full support for all Hitex, Intel, and Nohau emulation features
- ▶ Window-oriented user interface for Hitex, Intel and Nohau 8051 in-circuit emulation
- ▶ VGA and EGA compatible
- ▶ Multiple display windows with full color, window sizing, and pull-down menus
- ▶ All emulator commands, functions, and features supported
- ▶ Compatible with Franklin's 8051 C, debugger/simulator, monitor, etc.
- ▶ Full mouse control for your emulator
- ▶ Source-code window displays C, PL/M, assembler, or mixed code
- ▶ Compatible with Hitex, Intel and Nohau tools
- ▶ "Watch Window" shows user variables during execution

Contact

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Product Information

Franklin's New Target Scope 51 (TS51) gives you a whole new way of looking at your target and controlling your emulator. It offers you multiple windows and mouse support without the overhead of Microsoft Windows.

Target Scope provides a complete graphical user interface for supported emulators and their associated software. This enables Hitex, Intel and Nohau 8051 emulator users to control all aspects of in-circuit emulation using the mouse. Results are displayed in user-modifiable windows for source display, object code, trace memory, target status, and history. Target Scope supports Microsoft DOS 3.0.

Target Scope 51 is offered as a self-contained software product to enhance the use of Hitex, Intel and Nohau 8051 in-circuit emulators. It is completely transparent to the emulator hardware and software. TS51 runs as a TSR under DOS 3.0 or higher. It runs on a PC-AT or compatible with an 80286/386/486 processor and at least 512 K memory.

Specifications and Requirements

- IBM PC-AT or compatible
- DOS 3.0 or later
- 512 K RAM
- Hard-disk drive
- 1.2 MB, 5.25" floppy drive
- Parallel port

Ordering Information

- 7031 TS51 for Intel ICE51 FX emulator
- 7032 TS51 for Nohau EMU51 emulator
- 7033 TS51 for Hitex JUN51 emulator

Contact

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RTX51

RTX51 Real-Time Operating System

- ▶ Supports all members of the 8051 family of microcontrollers
- ▶ Provides dynamic memory-management functions for fast, effective use of CPU resources
- ▶ Supports both round-robin and pre-emptive task switching for up to 256 tasks, with 19 active at the same time
- ▶ Offers BITBUS and CAN interfaces as RTX51 tasks
- ▶ Lets you assign up to four scheduling priorities that work in parallel with interrupt functions
- ▶ RTX51 is fully integrated into the Franklin C51 software development environment
- ▶ The TASK and PRIORITY declarators are an integral part of the C51 compilers language semantics
- ▶ System and task consistency checks and all memory allocations are performed by the BL51 linker/locator
- ▶ Offers the smallest, fastest RTOS available for the 8051
- ▶ Is easy to use—integration with the C51 compiler eliminates need to write assembler statements

- ▶ Is easy to debug and simulate with the dScope-51 symbolic, high-level language debugger/simulator
- ▶ Use of advanced compiler features reduces code size and increases execution speed

Product Information

The new RTX51 is a powerful, dedicated, multitasking real-time operating system (RTOS) executive designed expressly for the 8051 family of microcontrollers. Use of a system executive like RTX51 simplifies system design, software programming, and debugging of complex applications that require fast reaction to time-critical events. RTX51 is an efficient and effective way to manage multiple jobs (tasks) on a single CPU. Typical RTX51 applications consist of real-time data acquisition and monitoring, microcontroller networks, process control, machine control, and robotics.

RTX51 is available in two versions: RTX51 and RTX51 Tiny. RTX51 is a full-featured RTOS for the 8051 capable of both round-robin and pre-emptive task switching. You can define up to 256 tasks, with 19 active at the same time. You can assign up to four scheduling priorities and still work completely integrated and in parallel with interrupt functions.

RTX51 Tiny is an abbreviated version of RTX51 and supports round-robin task scheduling. Requiring less than 800 K of CODE space, it runs exceptionally well on single-chip 8051s and has no explicit requirement for XDATA memory. RTX51 Tiny can execute up to 16 tasks. Code developed under RTX51 Tiny is completely compatible with RTX51.

Contact

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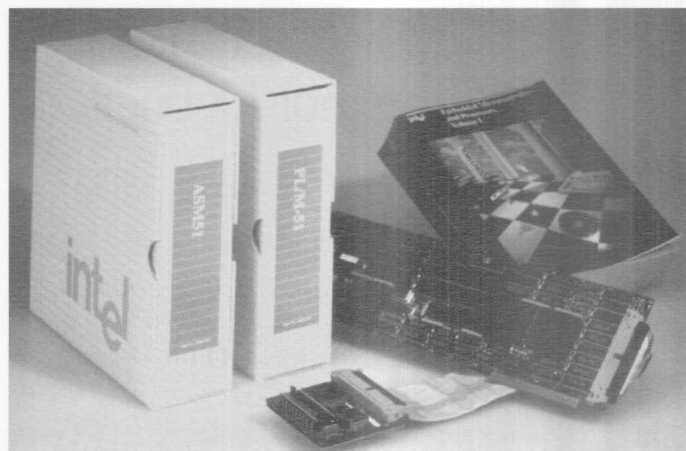
ASM-51

ASM-51 Assembler for MCS[®]-51 Family of Microcontrollers

- ▶ Full and accurate support for all MCS[®]-51 microcontrollers
- ▶ Macro facility saves development and maintenance time
- ▶ Simplified instruction set for easy program development
- ▶ Symbolic access to the MCS[®]-51 microcontroller family features

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

The ASM-51 macro assembler provides full and accurate support for all component instructions in the MCS[®]-51 family of microcontrollers. It provides symbolic access to the many features of the components, an include file with component registers, and memory space definitions. With the macro facility of ASM-51, common code sequences need only be developed once, saving both development time and maintenance.

Utilities

The ASM-51 assembler package includes the following utilities:

- Linker/Locator, for linking multiple MCS[®]-51 object modules into a single program, resolving all references between modules, and assigning absolute addresses to all relocatable segments. Modules can be written in either ASM-51 or PL/M-51.
- Librarian, for creating and maintaining libraries of software object modules. Standard modules can be placed in a library and linked into your application programs using the linker/locator. When using libraries, the linker will link only those modules required to satisfy external references.
- Object-to-hex converter, for converting Intel OMF51 object modules into standard hexadecimal format. This allows the code to be loaded directly into PROM using industry-standard PROM programmers.

Host

DOS V3.3 or later

Ordering Information for D86ASM51NL

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*™ document #2589.

51XASM, SIM51, and SIM52

MCS[®]-51 Cross-Assembler MCS[®]-51 Simulator-Debuggers

- ▶ Low-cost, fast, and efficient MS-DOS cross-assembler with total MCS-51 instruction-set support, fully symbolic, with conditional assembly; produces Intel formatted hex object code
- ▶ Multiple screen simulators with built-in stand-alone disassemblers
- ▶ User-interactive operation with easy-to-learn keyboard commands
- ▶ Instructions can be executed in single step, continuous interruptible mode, or between user-defined breakpoints
- ▶ Complete I/O simulation including serial communications; I/O ports, timers, counters, etc., can be loaded from the keyboard
- ▶ Full interrupt support. Incoming external signals are simulated with the use of "F" keys that act as debounced switches when pressed. These signals can be also programmed to occur at user-defined intervals in terms of machine cycles (T-states).

Contact

Lear Com Company
2440 Kipling St., Ste. 206
Lakewood, CO 80215
Tel: (303) 232-2226
Fax: (303) 232-8721

Lear Com Company

```
LEARN COM 0052 SIMULATOR-DEBUGGER VER 3.6 Copyright (c) Louis E. Archillo
0 1 2 3 4 5 6 7 8 9 A B C D E F Fast Trace -ON
00 ->00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 Register Bank-00
10 - 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 DEH DEL
20 - 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 DPTX - 00 00
30 - 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 TH TL
40 - 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 TVC-0 - FE 0E
50 - 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 TVC-1 - B0 CC
60 - 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 TVC-2 - 00 00
70 - 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 Cycles -00000289

INTERUPTS-[00000000] F2 -00001000
P0-[15] 00010101 P1-[39] 00110011 P2-[08] 00001000 KCAP2B-[00]
P3-[FE] 11111111 IE-[8A] 10001010 IP-[00] 00000000 KCAP2L-[00]
TCON-[20] 00100000 TCON-[50] 01010000 T2CON-[1B] 00011011 PTR-[00]
ACC-[39] 00110011 B-[00] 00000000 SCON-[00] 00000000 SBUF-[00]
PSW-[00] CY-0 AC-0 FO-0 RS1-0 RS0-0 OY-0 P-0 TRX-1167 SP-[07]
Breakpoints @ : None

PC - 0062 80EE SHP D05EB
0061 758964 MDY TDD0 ,#4B
0064 758A00 MDY TLO ,#00B
0067 758CF6 MDY TBO ,#6B
006A 758B80 MDY TLA ,#80B
006D 758D80 MDY TBL ,#80B

Command:
```

Cross-Assembler

You can run MCS-51 source programs of unlimited length, generated with the use of any ASCII editor or word processor, through our 51XASM to generate absolute Intel hex object code and an optional list file with cross-reference symbol table. The assembler is fully symbolic, and the instruction-set mnemonics are totally compatible with Intel's. The names of all SFR's and addressable bits are internally defined and can be used in the source code directly by name.

Simulator-debuggers

Our line of MCS-51 screen-based simulator-debuggers offers you a superb, cost-effective development and learning tool with versions for the basic 8051 and 8052 families of embedded controllers (SIM51 and SIM52).

The input to the simulators is the Intel hex file, as produced by any compiler or assembler. When first invoked, the Main Simulator Screen is displayed in the format shown above. There are four additional interactive screens: the Disassembler Screen, the Object Code Screen (up to 64 K), the External Memory Screen (up to 64 K), and the Internal Data RAM Screen (128/256 bytes).

System Requirements

- MS-DOS
- PC-DOS with 256 K or more RAM
- Color or monochrome display
- MS-DOS 3.0 or higher

Controllers Supported

- 8051
- 8052
- Compatibles

MICRO/C-51

MICRO/C-51™ 8051 C
Compiler Kit

- ▶ Unrestricted variable placement; use *all* your memory maps
- ▶ Direct "C" access to *all* on-chip devices
- ▶ Power-up your Boolean processor
- ▶ Drive *any* "C" function from *any* interrupt source
- ▶ Kit includes MICRO/C-51 Compiler and MICRO/ASM-51 Relocatable Macro Assembler
- ▶ Complete 8051 Developer's Kit for only \$99.95
- ▶ Add our optional MICRO/SLD-51 Simulator/Source-Language Debugger, only \$79.95
- ▶ Call for our software tools catalog with complete technical details and a *FREE DEMO DISK*.

Contact

Micro Computer Control Corporation
P.O. Box 275/17 Model Ave.
Hopewell, NJ 08525
Tel: (609) 466-1751
Fax: (609) 466-4116

```
/* hello.c MICRO/C-51 Sample Program */

#define T1M1    0x20    /* Timer 1 Mode */
#define SMOD    0x80    /* Serial Mode Doubling */
#define BAUD    0xfd    /* 19.2K baud @ 11.059 Mhz */

main()
{
    /* Initialize Serial Port */

    sm1 = 1;           /* 8-bit UART */
    tmod = T1M1;       /* Timer1 8-bit Auto-Reload */
    tl1 = th1 = BAUD;  /* Set Baud Rate */
    pcon = SMOD;       /* Double Baud Rate */
    tr1 = 1;           /* Start Timer1 */
    ti = 1;            /* Make Tx Ready */

    while (1) /* loop forever */
    {
        printf("Hello, world/n");
    }
}
```

Product Information

Is your latest project falling behind schedule? Need programming speed and flexibility? Put a real power boost to your development efforts, move up to MICRO/C-51, our "C"-like Cross-Compiler for embedded controllers.

MICRO/C-51 supports 8051 derivative chips from Intel, Philips, Dallas Semiconductor, and others. And it's user-configurable to support even the newest chips as they become available.

Would you like to prototype a system in hours or add interrupt code in minutes? MICRO/C gives you the speed and ease of programming in "C", while giving you complete control of your micro's hardware.

Included with the kit is MICRO/ASM-51, our Relocatable Macro Assembler. This product contains our MA51 Assembler, ML51 Linker, MLB Librarian, and our comprehensive 400+ page User's Guide.

Need help tracking down bugs? Try our optional MICRO/SLD-51 Simulator/Source-Language Debugger. It provides a complete target-system debugging environment right on your PC, no additional hardware required.

System Requirements

- IBM PC or compatible
- At least 256 K
- Single diskette or more
- DOS 2.1 or later

Chips Supported

All 8051-based microcontrollers including NMOS, CMOS, OTP, ROM, ROMless, and internal or external RAM-based systems.

Availability

Now!

I80008

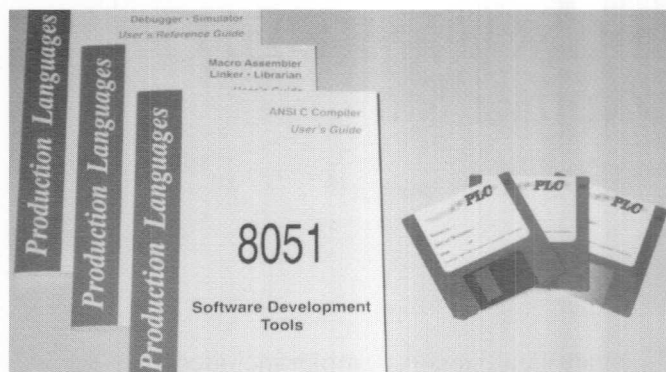
8051 C Cross Compiler

- ▶ Produces highly optimized 8051 code (both machine-dependent and machine-independent optimizations)
- ▶ Optimizes for speed and size
- ▶ Provides small, compact, medium, and large memory models
- ▶ Supports IEEE floating-point
- ▶ Allows interrupt service routines to be written in C
- ▶ Generates ROMable code
- ▶ Optimizes calls to run-time library routines
- ▶ Provides ANSI C with extensions for embedded systems
- ▶ Provides ANSI C const and volatile storage classes
- ▶ Provides ANSI C runtime library (8051 specific run-time routines, 8051 intrinsic functions, source provided to runtime library)
- ▶ Offers static frames (compiled stack) option
- ▶ Assembly embedded within C source

Contact

PLC
P.O. Box 109
Weatherford, TX 76086
Sales: (800) 525-6289
Fax: (817) 599-5098

PLC
PRODUCTION LANGUAGES CORPORATION



Product Information

The PLC 8051 C Cross Compiler and accompanying development tools—including a macro assembler, linker/locator, object librarian, source-level debugger, and instruction simulator—take you from design to deliverable product with a seamless integrated system when targeting the 8051 family of microcontrollers (including the 8052 and the 8031).

Optimizations

The 8051 ANSI C Cross compiler performs optimizations that are particularly well suited for the 8051, as well as standard machine optimizations expected of production-quality embedded-systems compilers. Strict conformance to ANSI C is supported, but when ANSI gets in the way of efficiency, the PLC 8051 C Cross Compiler uses powerful, industry-accepted language extensions to squeeze maximum performance out of the CPU.

The 8051 C Cross Compiler provides global and local optimizations, including the removal of unreachable, redundant, or dead code, as well as common subexpression elimination, redundant jump optimizations, and branch chaining code improvements.

In addition, the compiler performs peephole, loop, and span dependent instruction optimizations, and generates efficient switch statements. It also provides other optimizations such as algebraic simplifications, constant folding, and strength reduction.

Data Types

8-bit chars, 16-bit shorts, 16-bit ints, 32-bit longs, 8- and 16-bit pointers, and 32-bit floats.

Intrinsics

Several commonly used run-time routines are implemented as intrinsic functions, which expand into optimized inline code, eliminating the overhead of calling a function.

Static Frames

The PLC 8051 C Cross Compiler supports the use of static frame (compiled stacks) to more fully utilize the 8051 architecture. Using a program call graph, the PLC 8051 linker views your entire application and determines the most effective way of allocating memory.

Host Systems Supported

MS-DOS and PC-DOS

Processors Supported

8051, 8052, and 8031

Ordering Information

Order number: I80008. Available now.

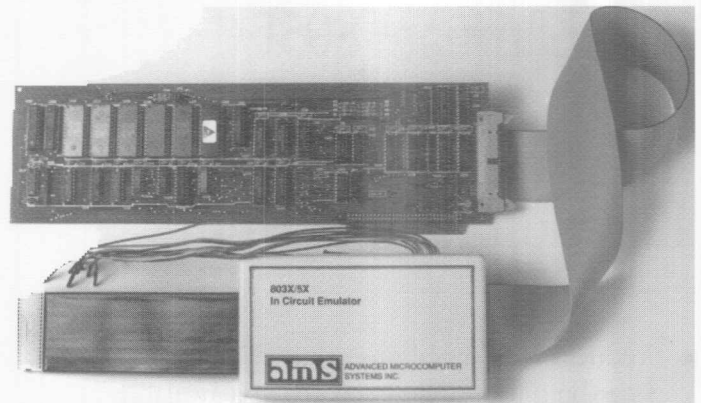
EZ-ICE™ PRO-32C

EZ-ICE™ PRO-32C In-Circuit Emulator and Development System for 803x/805x

- ▶ C Compiler, Cross Assembler included
- ▶ Real-time source-level debug
- ▶ 1500 instruction trace
- ▶ 128-K emulation memory
- ▶ 64,000 breakpoints
- ▶ 32 Kbytes deep, 40 bits wide
- ▶ One pod emulates 8031, 32, 51, 52
- ▶ Support for 80535, 80552, and 8751
- ▶ All CMOS versions, 16 MHz
- ▶ C- and assembly-language support
- ▶ In-line assembler/disassembler
- ▶ Support for single-step, run, display modes
- ▶ Support for stand-alone mode

Contact

Advanced Microcomputer Systems Inc.
1460 Southwest 3rd. St., Suite B-8
Pompano Beach, FL 33069
Tel: (800) 972-3733 or (305) 784-0900
Fax: (305) 784-0904



Product Information

The PRO-32C In-Circuit Emulator provides advanced functionality and powerful features that any engineer can afford. PRO-32C meets the needs of both advanced users and novices with its Windows like interface features, standard pull-down menus, multiple information windows, and extensive online help. A mouse is supported but is optional.

You can single step an instruction at a time, or RUN target programs at full processor speed without inserting wait states. Assembly and C languages are supported.

PRO-32C's stand-alone mode enables designers to develop programs before the hardware is available. Assembly and C language source-level debugging is supported. The high-speed memory design allows real-time execution of user programs. The trace buffer can trace the most recently executed 2000 instructions of the target program.

The in-line assembler and disassembler allows you to insert, delete, or edit any assembly-language instruction. The software automatically converts the instructions to their hex equivalents. This is very important while debugging hardware designs in the target system. The PRO-32C development system includes a C compiler and cross assembler, thus providing a complete single-source package with full hardware and software support.

A microprocessor development board (EZ-8032) and EZ-CASM Pro C compiler are also available as options.

The board is equipped with EPROM, RAM, A-D, an LCD display, a serial port, full 16-channel 18-Bit A-D converter, plus watchdog timer and clock/calendar. EZ-8032 also has a C-language source-code driver for A-D measurement, LCD display functions, and serial communications.

EZ-CASM Pro is a professional-edition C- and assembly-language software development system for use with the PRO-32C.

Complete system includes:

- In-circuit emulator
- EZ-CASM Std. C Compiler
- Cross assembler
- In-line assembler/disassembler

Options Available

- EZ-CASM Pro C Compiler
- EZ-8032 development board

Ordering Information

- Part Number: Pro-32C
- List Price: \$995
- Includes C compiler and cross assembler

The Ultimate 8051 Family I.C.E.: The Trace 32 Development System

- ▶ The most advanced no-compromise system for logic development and analysis available
- ▶ Complete system control from a multiwindow, multitasking, real-time debugger for C, ADA, PL/M, Pascal, Modula-2, and ASM
- ▶ Control and debugger interfaces for PC-DOS, 386 UNIX, Sun 3, SPARC, HP 9000-300/400/700, VAX/VMS, and DECStation
- ▶ Support for 8051 derivatives from Intel, Siemens, Philips/Sigmetics, AMD, and OKI
- ▶ Ethernet, SCSI, fiber-optic, serial, and parallel host/target interfaces available
- ▶ Expandable to 16 MB of emulation memory and 16 MB of breakpoint memory using static or dynamic RAM
- ▶ Multiprocessor development and debug using special synchronization logic
- ▶ Modular design facilitates simple low-cost conversion to different microprocessors

Contact

BSO/TASKING World Headquarters
333 Elm Street
Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

Call (800) 458-8276 for detailed product information.

**BOSTON
SYSTEMS
OFFICE
TASKING**

BSO/TASKING In-Circuit Emulation Systems and Logic Analyzers

• Trace 32 I.C.E. Systems

Trace 32 I.C.E. Systems by Lauterbach provide the ultimate technology available for leading-edge microprocessor development. Trace 32 is a universal development system with capabilities that are simply not found in other I.C.E. products. Trace 32 I.C.E. Systems provide in-circuit emulation, logic state and timing analysis, simulation, performance analysis, a universal device programmer, a universal counter/timer, a pattern/stimulus generator, a frequency/pulse generator, communications analysis, and more.

Each instrument is controlled directly from the host workstation or PC, through a sophisticated X or Microsoft Windows interface that includes a powerful multilanguage, multitarget debugger. This multitasking, real-time debugger supports C, ADA, PL/M, Pascal, Modula-2, and assembly language. In addition, all Trace 32 Systems support multiprocessor development and debugging through special synchronization logic, and every system provides four inter-trigger lines to trigger other instruments or accept external triggers.

Standard interfaces include RS-232, RS-422, and optionally high-speed fiber-optic or Ethernet interfaces.

You can configure these options to fit your special development needs. *Upgrade-ability to other micros and other options is the most cost-effective of any I.C.E. system on the market.* Trace 32 supports up to 16 MB of RAM and over 100 popular microprocessors and controllers.

If you require the highest-quality I.C.E. system available, call BSO/Tasking and ask for information on Trace 32.

• NetROM ROM Emulator

Designed around the network

NetROM emulates four 8-bit ROMs of 256 K or 1 MB of ROM to speed you through software development. No more burning and erasing, then plugging and unplugging EPROMs. ROM emulation saves time, effort, and materials, cutting back your development cost.

Now combine these features with a high-speed network interface and the ability to use standard Ethernet protocols to download and access your design from anywhere on the network, even remotely. Your target does not even need a comm port—simply ROM space that can be used by NetROM's virtual UART or serial port.

Over the network, you restart the target and begin your session. NetROM supports TCP, UDP, IP, ICMP, and SLIP protocols and includes Telnet, TFTP, BOOTP, RARP, SNMP, and PING applications.

IDS/LC™

Integrated Debugging System/LC (IDS/LC™)

- ▶ Combines the functions of an In-Circuit Emulator, 128-K PROM emulator, editor, and C source-level symbolic and object code debugger in a Borland Turbo C-like environment
- ▶ Works with 8051 C compilers from Franklin, Keil, Archimedes/IAR, Avocet, Intermetrics/Whitesmith/Cosmic, and 2500AD
- ▶ Provides real-time operation with zero wait states
- ▶ Single Target Interface Unit™ supports 8051 family variants up to 20 MHz without costly adapters or pods
- ▶ Offers 1,000 source- or assembly-level breakpoints
- ▶ Offers complete control of program execution with Run, Reset, Run To Cursor, Step, and Stop commands
- ▶ Provides 30-day money-back guarantee and one-year warranty
- ▶ The price for a complete 8051 system is just \$995 and is available *now*.

Contact

Cactus Logic
180 North Vinedo Avenue
Pasadena, CA 91107
Tel: (800) 847-1998
Fax: (818) 796-6011

Cactus
LOGIC



Product Information

Cactus Logic's low-cost, real-time emulator, the Integrated Debugging System/LC provides a PC-based environment for 8051 firmware debugging and testing through your target system's PROM socket.

You control the debugging, editing, compiling and object-code downloading functions using simple keystrokes or mouse clicks along with pull-down command menus and dialog boxes.

The command menus control the operation of the IDS and can be activated with either the keyboard or the mouse. Hot keys are provided for most commands. Here is the listing of the commands available:

- About: (IDS version, etc.), External Programs
- File: Open, New, Save, Save as, Download, Upload, Format, Change dir, Print, Get info, DOS shell, Exit
- Edit: Cut, Copy, Paste, Show clipboard, Clear
- Search: Find, Replace, Again, Go to line number
- Run: Run, Reset, Stop, Run to Cursor, Trace, Step, Animate, New PC
- Compile: Compile, Make, Setup Compiler, Setup Make
- Debug: Toggle breakpoint, Breakpoints, Watches
- Options: External programs, Environment, Target System, Save options
- Window: Size/Move, Zoom, Tile, Cascade, Next, Previous, Close, CPU, SFR display, Program memory, Internal RAM, External RAM, Watch, Output, List
- Help: Index, Previous topic, Help on help

Up to 1,000 powerful source- and assembly-level breakpoints are simple to set. They can be assigned to groups that can be enabled or disabled by other breakpoints or enabled after a specified number of 'hits'. Breakpoints can also trigger secondary actions such as logging processor and watch window data to disk files or simulating input or output data.

Support

The IDS/LC also supports the Motorola 68HC11 and Zilog Z80 microprocessors and their variants.

DS-51

Ceibo DS-51-Microprocessor Development System

- ▶ Real-time and transparent in-circuit emulator
- ▶ 1.5 V to 6 V microcontroller emulation
- ▶ Maximum frequency of 40 MHz
- ▶ 128 K of internal memory
- ▶ 32 K trace memory and logic analyzer
- ▶ 64 K hardware and conditional breakpoints
- ▶ Source-level debug for assembler, PL/M, and C
- ▶ Online assembler and disassembler
- ▶ Performance analyzer
- ▶ Serially linked to IBM PC or compatible Host

Contact

Ceibo
1 Ballard Terrace
Lexington, MA 02173 USA

USA	Tel: (617) 863-9927	Fax: (617) 863-9649
Germany	Tel: 6151-99320	Fax: 6151-993299
Israel	Tel: 052-555387	Fax: 052-553297
Spain	Tel: 91-4778995	Fax: 91-4779075
Sweden	Tel: 0589-19250	Fax: 0589-16153
Italy	Tel: 051-727252	Fax: 051-727515
France	Tel: 061-855767	Fax: 061-851914
Taiwan	Tel: 02-9160977	Fax: 02-9126641



Product Information

The Ceibo DS-51 is a real-time in-circuit emulator dedicated to the 8051 family of microcontrollers. It is serially linked to a PC/XT/AT or compatible host and transparently emulates the target microcontroller.

DS-51 supports the new low-power and low-voltage 8051 microcontrollers and derivatives.

The system can emulate the microcontrollers using either the built-in 5 V power supply or any voltage applied to the target circuitry. This selection is accomplished through software control. The permitted voltage range is from 1.5 V to 6 V or higher.

The software includes a source-level debugger for PL/M and C, a unique assembler debugger, a performance analyzer, an online assembler and disassembler, conditional breakpoints, and many other features.

DS-51 accepts files generated by the most common 8051 assemblers and high-level language compilers. From your assembler, PL/M, or C source-code screen, you can specify a breakpoint; redefine the program counter; execute a line step or an assembly instruction; open a flexible-in-size watch window to display variables; and use the function keys to display the trace memory, registers, and data.

Standard systems are supplied with 128 K of internal memory, 64 K hardware breakpoints, 32 K real-time trace memory and logic analyzer with external test points, and personality probe supporting most of the 40-pin DIP or 44-Pin PLCC/QFP microcontrollers.

DS-51 emulates almost every 8051 derivative in the complete voltage and frequency range specified by the microcontroller manufacturer. The minimum frequency is determined by the emulated chip characteristics, while maximum frequency is up to 40 MHz.

Support

The DS-51 supports the following microcontrollers: 8031/2, 80C31/2, 80CL31/2, 8051/2, 80C51/2, 87C51/2, 8XCL51, 8XC51FA/FB, 8XCL410, 80C515, 80C517, 8XC524, 8XC528, 80C535, 80C537, 8XC550, 8XC552, 8XC562, 8XC575, 8XCL580, 8XC592, 8XC652, 8XC654, 8XCL781, 8XC851, SAB-C501/2/3, and others.

CEIBO

DB-51

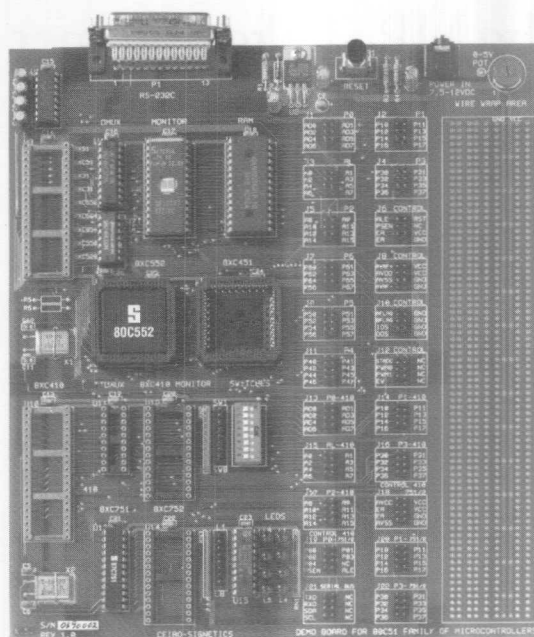
Ceibo/Phillips DB-51 Development Board

- ▶ Support for most of the 80C51 microcontrollers
- ▶ 32 K of user-code memory
- ▶ Programs execute in real-time
- ▶ Software trace and breakpoints
- ▶ Source-level debug for assembler, PL/M, and C
- ▶ Online assembler and disassembler
- ▶ Performance analyzer
- ▶ Special wire-wrap area for prototyping
- ▶ User's manual with examples and applications
- ▶ Serially linked to IBM PC or compatible host

Contact

Ceibo
1 Ballard Terrace
Lexington, MA 02173 USA

USA	Tel: (617) 863-9927	Fax: (617) 863-9649
Germany	Tel: 6151-99320	Fax: 6151-993299
Israel	Tel: 052-555387	Fax: 052-553297
Spain	Tel: 91-4778995	Fax: 91-4779075
Sweden	Tel: 0589-19250	Fax: 0589-16153
Italy	Tel: 051-727252	Fax: 051-727515
France	Tel: 061-855767	Fax: 061-851914
Taiwan	Tel: 02-9160977	Fax: 02-9126641



Product Information

The Ceibo/Phillips DB-51 is a high-performance system-design board dedicated to the 80C51 family of microcontrollers. It provides an easy-to-use, flexible instrument that enables you to build a primary prototype, analyze and debug it, make changes, and continue debugging. Furthermore, you can improve your design decisions by using the DB-51 to check and test the advantages of several different microcontrollers. The DB-51 is also a great training and tutorial aid for becoming familiar with designs that use the 80C51 architecture.

The software supplied with DB-51 includes a source-level debugger for PL/M and C, a unique assembler debugger, a performance analyzer, an online assembler and disassembler, software trace, conditional breakpoints, and many other features.

The DB-51 accepts files generated by the most common 8051 assemblers and high-level language compilers. From your assembler, PL/M, or C source-code screen, you can specify a breakpoint; redefine the program counter; execute a line step or an assembly instruction; open a flexible-in-size watch window to display variables; and use the function keys to display the trace memory, registers, and data.

The DB-51 provides 32 K of user-code memory. This RAM memory lets you download and modify your programs.

Breakpoints allow real-time program execution until an opcode is executed at a specified address or line of your source code.

DB-51 is serially linked to a PC or compatible host. The system includes the power supply and RS-232 interface cable.

Support

The following microcontrollers are fully supported: 8X31/51, 8X32/52, 8XC31/51, 8XC32/52, 8XC451, 8XC524, 8XC528, 8XC550, 8XC552, 8X562, 8XC575, 8XC652/4, 8XC851, and others with external memory addressing and a UART. The 8XCL410 and 8XC751/2 have a limited support.

CEIBO

MP-51

Ceibo MP-51-Programmer

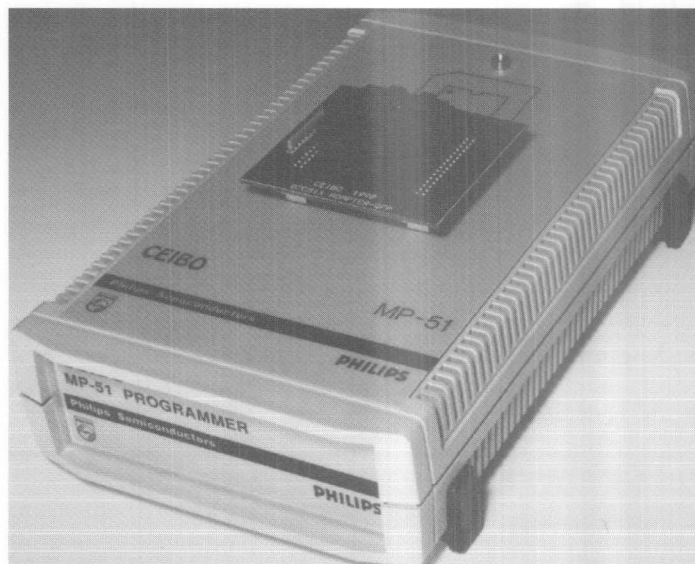
- ▶ EPROM, PLD, PSD, and microcontroller programmer
- ▶ Serially linked to PC or compatible host
- ▶ Programs all the 8051 microcontrollers
- ▶ Supports 24- to 32-pin EPROMs
- ▶ Programs PLD and PSD devices
- ▶ Provides easy-to-follow windows and pull-down menus
- ▶ Programs encryption tables and lock bits
- ▶ Handles hex, binary, object, and JEDEC files
- ▶ Programs DIP, QFP, LCC, and PLCC devices
- ▶ Supports all the security features

Contact

Ceibo
1 Ballard Terrace
Lexington, MA 02173 USA

USA	Tel: (617) 863-9927	Fax: (617) 863-9649
Germany	Tel: 6151-99320	Fax: 6151-993299
Israel	Tel: 052-555387	Fax: 052-553297
Spain	Tel: 91-4778995	Fax: 91-4779075
Sweden	Tel: 0589-19250	Fax: 0589-16153
Italy	Tel: 051-727252	Fax: 051-727515
France	Tel: 061-855767	Fax: 061-851914
Taiwan	Tel: 02-9160977	Fax: 02-9126641

CEIBO



Product Information

Ceibo MP-51 is a high-quality microcontroller, EPROM, and PLD programmer dedicated to all the 8051-family microcontrollers, 24- to 32-pin EPROMs, high-density PLDs, and PSD devices.

The programmer consists of the instrument and adapters. The adapters can be replaced to suit your requirements. Adapters are available for all the possible packages, such as DIP, LCC, PLCC, and QFP.

The MP-51 commands are organized in pull-down menus and windows. This software is powerful yet extremely user-friendly. The available functions include TYPE, BLANK CHECK, SECURITY, PROGRAM, LOAD, SAVE, READ, VIEW, COMPARE, CHECKSUM, FILL, MOVE, MODIFY, DIRECTORY, TEXT FILE, DUMP, etc.

MP-51 software handles a PC memory buffer where code is loaded from a disk or filled with the contents of a device. Furthermore, you can save this buffer on a disk file, move parts of the buffer from one location to another, fill it with a constant, or modify it. You can display the memory buffer in both hex and ASCII formats.

MP-51 allows you to enable or disable the PLD or microcontroller security capabilities and handles lock bits and encryption table available in several microcontrollers. MP-51 loads different file formats: Intel hex, Intel OMF, binary, Motorola S-records, JEDEC, etc.

An RS-232 interface is used to link MP-51 to a PC or compatible host.

Standard systems are supplied with any two adapters.

Support

The MP-51 supports the following devices: EPROMs (2716 to 27040), PLDs (AT16V8, AT22V10, ATV750, ATV2500, ATH3000, ATV5000, etc.), microcontrollers (8751H, 8751BH, 87C51, 87C51FA, 87C51FB, 87C51FC, 87C51GB, 87C52, 87C451, 87C524, 87C528, 87C550, 87C552, 87C562, 87C575, 87C592, 87C598, 87C652, 87C654, 87C751, 87C752, 87CO54-MTV, etc.), and PSD devices (PSD301/2/3/L, PSD 311/2/3/L, PSD4xx, etc.).

DryICE, SBC, and SIM Product Families

In-Circuit Emulators
DryICE, DryICE Plus
 Single-Board Computers
8031SBC, 80C552SBC
 Software Simulator
8051SIM

► In-circuit emulators

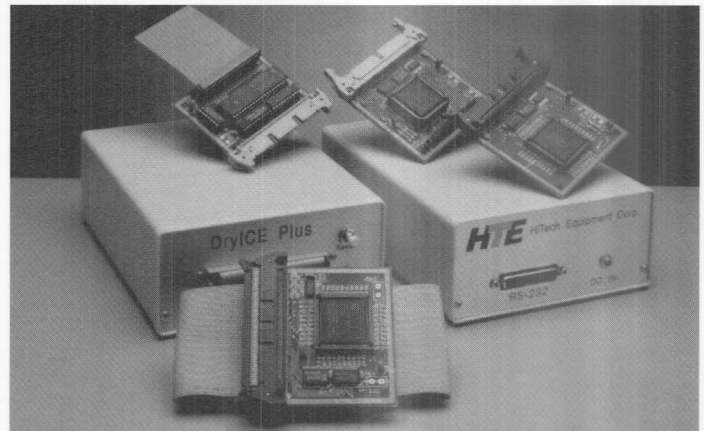
- Low-cost emulators starting at \$199
- Support for a wide range of 8051 family microcontrollers
- Optional 16 K real-time trace buffer
- PC host slots not required
- Compatible with third-party compilers and assemblers

► Single-board computers

- Low cost starting at just \$69
- 8-channel 10-bit A-D, D-A, 40 I/Os
- On-board ROM monitor/debugger
- Small form factor with I/O expansion
- Custom design and manufacturing

Contact

HiTech Equipment Corporation
 9400 Activity Road
 San Diego, CA 92126
 Tel: (619) 566-1892
 Fax: (619) 530-1458
 Electronic mail: Compuserve ID 70662.1241
 Internet 70662.1241@compuserve.com



System Requirements

- DryICE and SBC product family:
 - Macintosh or IBM PC/AT (or 100% compatible) with DOS 2.0 or later, 512 Kbytes of memory and a serial port. Modem control software is also required to download code to the emulator or single-board computer.
- 8051SIM:
 - IBM PC/XT/AT or 100% compatible with at least 256 K RAM, DOS 2.0 or higher, and 5.25" 360 K drive.

Processors Supported

- DryICE Plus supports the following processors:
 - 8031
 - 80C31
 - 8032
 - 80C32
 - 87C51
 - 80C51FA/FB/FC
 - 80CL51
 - 80CL410
 - 80C154
 - 80C451
 - 80535
 - 80C535
 - 80C552
 - 80C562
 - 80C652
 - 8031SBC is optionally available with an 8032 or 80C32 CPU.

Ordering Information

Call Hi-Tech Equipment at (619) 566-1892 to place your order or to receive product information and pricing. HTE accepts major credit cards and purchase orders upon credit approval. Foreign orders are also accepted. You can also place orders via electronic mail at Compuserve ID 70662.1241 or Internet 70662.1241@compuserve.com.



teletest 51

teletest 51
professional

- ▶ Professional development system for the 8051 family
- ▶ Support of more than 70 variants of the 8051 microcontrollers
- ▶ Modular design and excellent functionality
- ▶ Fully windowed operating environment with HiTOP
- ▶ Runs on every PC under DOS or Windows
- ▶ Real-time emulation up to 40 MHz
- ▶ 128 K bytes of emulation memory
- ▶ 64 K hardware breakpoints
- ▶ Sophisticated performance analysis
- ▶ Nonintrusive access to internal RAM in real-time via triggers

Contact

Hitex GmbH
Greschbachstr. 12
7500 Karlsruhe 41
Germany
Tel: +721 9628-0
Fax: +721 9628-149

**Product Information**

The teletest 51 emulation system offers a highly modular design for powerful emulation of the 8051 family. More than 70 variants of the 8051 microcontroller family can be supported by simply exchanging the appropriate adapter cable.

The teletest 51 lets you define both hardware breakpoints and complex trigger conditions. You can use them to control trace recording and the real-time counter (1 μ s resolution). In addition, the teletest 51 offers you logical combination of triggers in sequences and nonintrusive, on-the-fly functions.

HiTOP is the new SAA-based operating software used by all Hitex in-circuit emulators. It lets you open, position, and size windows according to your needs and gives you rapid access to all functions through either the keyboard or mouse.

HiTOP supports all popular compilers and assemblers—also for banked applications—from Intel, Franklin/Keil, Archimedes/IAR, and other manufacturers.

HiTOP provides you with unrestricted high-level language debugging. You can display real-time trace recording either in high-level language or assembler form. The benefits offered by the included performance analysis and coverage functions help optimize the efficiency and controllability of program flow.

Thanks to the Hitex policy of continuing development and the universal approach, new versions of the rapidly growing 8051 family can be emulated immediately after their appearance on the market. All these outstanding technical features and functions have established teletest 51 as the European leader in the 8051 embedded microcontroller application development.

hitex

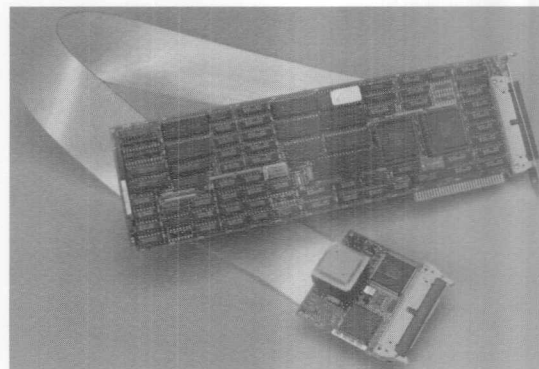
ICE™-51/PC In-Circuit Emulators for the MCS®-51 Microcontrollers

- ▶ Low-cost PC enhancement card
- ▶ Full component-speed emulation for real-time emulation
- ▶ Intel windowed human interface
- ▶ Mouse support to control the Intel windowed human interface
- ▶ Source-level debugging with symbolic referencing and display
- ▶ Powerful event recognition
- ▶ Dynamic trace and fastbreaks
- ▶ 128 KBytes of mappable memory
- ▶ Code coverage and CPU usage performance analysis

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

ICE™-51FX/PC
ICE™-51GX/PC



Product Information

The ICE™-51/PC family of in-circuit emulators for the MCS®-51 family of microcontrollers is easy to use, powerful, and attractive in price. A windowed user interface with mouse support and source-level debugging simplify use. The sophisticated event-recognition features, the ability to access debug information during emulation, and performance-analysis functions provide debugging power. The emulators provide real-time transparent emulation to 20 MHz to speed development of hardware and software and to enhance system integration and test.

The color windowed human interface, accessible also by mouse, has pull-down menus, function keys, and online help to simplify the debugging process. Source-level debugging of object modules produced by assembler and compilers speeds the development process measurably. The emulators' debugging features and windowed interface work together to enhance and further speed debugging. Programs are loaded under menu control, breakpoints are selected by point and set methods, and trace specifications are set through fill-in-the-blanks forms.

The emulators give you access to sophisticated event-recognition capabilities. The events can then be used as triggers, including compound triggers. Break registers store trigger definitions for reuse. The fastbreaks feature allows you to execute emulator commands with minimal intrusion on emulation. Code coverage reporting allows you to determine how thoroughly code has been tested. Statistical execution profiling allows you to develop more efficient code by showing where program bottlenecks exist.

Host

DOS V3.3 or later

Sysytem

IBM PC, XT, AT, PS/2, or 100% compatible machines

Memory

640 KBytes of RAM, 1.2 MBytes of free disk space

Components Supported

- ICE-51 FX/PC: 8031, 80C31, 8x51, 8xC51, 8032, 80C32, 8x52, 80C52, 8xC51FA, 8xC51FB, and 8xC51FC
- ICE-51 GX/PC: 87C51GB

Ordering Information for pICE51FXPC and pICE51GXPC

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK™* document #2589.



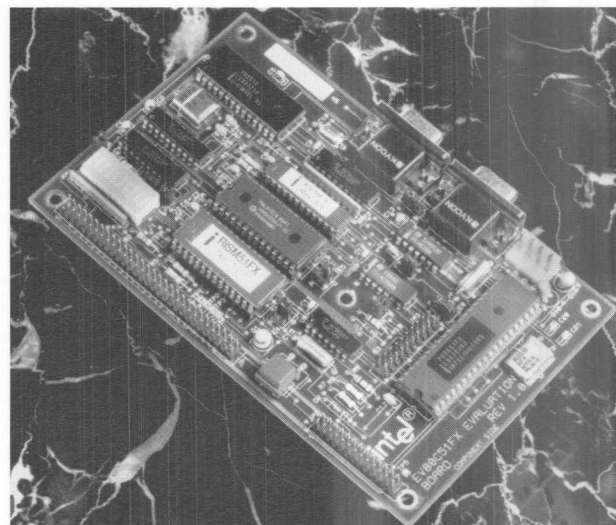
EV80C51FX EV80C51GX

EV80C51FX EV80C51GX Evaluation Board

- ▶ Up to 16 MHz execution speed
- ▶ 32 Kbytes of ROMsim
- ▶ Flexible chip-select controller
- ▶ Totally CMOS, low-power board
- ▶ Concurrent interrogation of memory and registers
- ▶ 16 software breakpoints
- ▶ Program step mode
- ▶ High-level language support
- ▶ Single line assembler/disassembler
- ▶ RS-232C communication link

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Low-Cost Code-Evaluation Tool

Intel's EV80C51FX and EV80C51GX evaluation boards provide a hardware environment for code execution and software debugging at a relatively low cost. The boards feature the 80C51FC and 80C51GB, single-chip, CHMOS[®], 8-bit microcontrollers, the latest members of the industry-standard MCS[®]-51 family. The board allows you to take full advantage of the power of the MCS[®]-51 architecture. The EV80C51FX and EV80C51GX boards provide up to 16 MHz execution of your code. Plus, its memory (ROMsim) can be reconfigured to match your planned memory system, allowing for exact analysis of code-execution speeds in a particular application.

Popular features such as a single-line assembler/disassembler, single-step program execution, and 16 software breakpoints are standard on the EV80C51FX and EV80C51GX. Intel provides a complete code development environment using assembly language (ASM-51) as well as Intel's high-level language PL/M-51 to accelerate development schedules.

The evaluation boards are hosted on an IBM PC or BIOS-compatible clone, already a standard development solution in most of today's engineering environments. The source code for the on-board monitor (written in ASM-51) is public domain. The program is about 3 Kbytes and can be easily modified to be included in your target hardware. In this way, the provided PC host software can be used throughout the development phase.

Personal Computer Requirements

The EV80C51FX and EV80C51GX evaluation boards are hosted on an IBM PC XT AT or BIOS-compatible clone. The PC must meet the following minimum requirements:

- 512 Kbytes of memory
- A 360-Kbyte floppy-disk drive
- PC DOS v3.1 or later
- One serial port (COM1 or COM2) at 9600 baud
- ASM-51 or PL/M-51
- A text editor such as AEDIT

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBack*[™] document #2589.



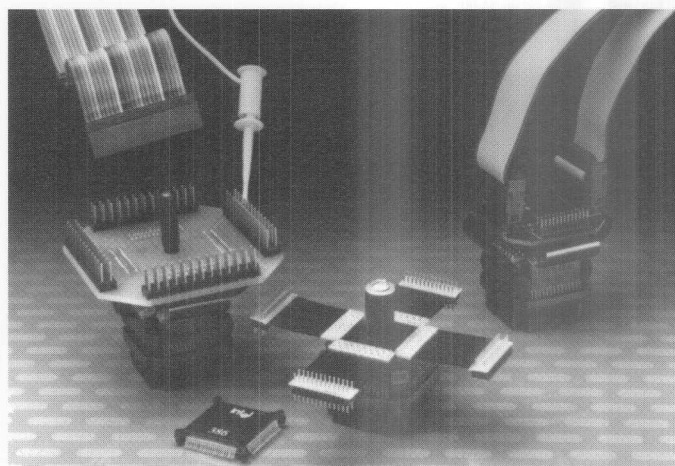
MCS[®]-51 AccessoriesMCS[®]-51 Accessories

- ▶ Compatible with the full family of microcontrollers and support chips
- ▶ Full family of test clips for surface-mounted and thru-hole DIP, SOIC, SOJ, PLCC, PQFP, CQFP, MQFP, SSOP, TQFP, VQFP, TSOP, and TSSOP
- ▶ Locking action and two phases of contact alignment
- ▶ Different interfaces available for attachment to your instrument
- ▶ Custom sizes and configurations available by quotation
- ▶ Application support and technical assistance available

Contact

For technical information:
Bob Poirier at ITT Pomona
Tel: (909) 469-2912
Fax: (909) 629-3317

For pricing and availability or literature:
Contact Customer Service at (909)-469-2900

**Product Information**

These test clips are designed to aid emulation, production, or field testing and repair. Pomona offers a broad selection of clips in a wide assortment of configurations and sizes. From DIP clips to QFP clips for ceramic or plastic chips of greater than 200 pins, Pomona makes them all.

Pomona's patented locking clips connect to even the smallest support chip, such as a 20-pin QSOP package with a height of less than 1.4 mm. We also offer clips that handle four-sided SQFP chips with lead pitch of .5 mm and closer.

If you find your device is not included among our listed standards, contact us for a custom quotation. Many of these new configurations can be readily created with our in-house rapid-response capability.

To receive a Surface Mount and IC Test Accessories brochure or Pomona Catalog or to place an order, contact Customer Service.

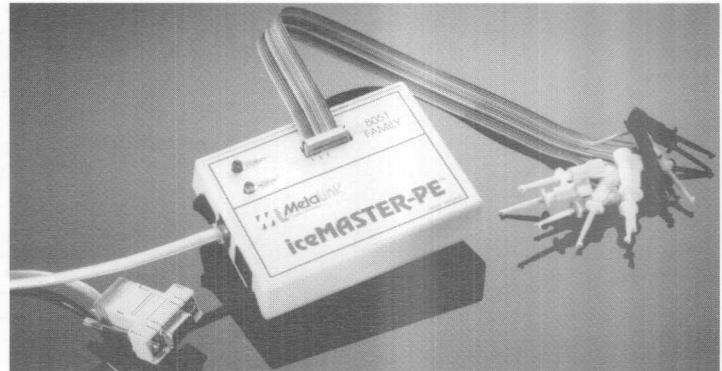
PE 8051 Family

iceMASTER-PE™ 8051 Family of In-Circuit Emulators

- ▶ Full-featured, real-time and transparent emulator
- ▶ Supports 8051-family devices up to 40 MHz
- ▶ Supports 8031s and 8032s
- ▶ Integrates emulation and probe electronics into a single package
- ▶ Plugs directly into target applications or operates in a stand-alone mode
- ▶ Based on patent-pending AET design architecture
- ▶ Hardware features:
 - 64 K program and 64 K external data memory
 - 16 K frame trace buffer
 - View trace while executing
 - 128 K hardware breakpoints
 - 64 K trace ON/OFF triggers
 - Integrated self-test capabilities
- ▶ System features:
 - PC-hosted via RS-232 serial link
 - Efficient, powerful, easy to learn
 - Windowed user interface with control of size, content, position, and color
 - Third-party Assembler and Compiler support
 - Full symbolic and source-level debug

Contact

MetaLink Corporation
325 E. Elliot Road
Chandler, AZ 85225
Tel: (602) 926-0797
Fax: (602) 926-1198
David Yeskey



Product Information

The unique iceMASTER-PE packs advanced features into a tiny, palm-sized package that any engineer can afford. Designed for demanding projects, iceMASTER-PE supports frequencies up to 40 MHz with a full complement of emulation memory, external data memory, and a transparent trace buffer 16 K frames deep with advanced searching capabilities.

The iceMASTER-PE is the world's most portable emulator because both the emulator and probe electronics are integrated into a package the size of a PC mouse. The entire emulator plugs directly into the target applications or operates in a stand-alone mode.

The iceMASTER-PE windowed user interface delivers the highest development productivity. Its context-sensitive hypertext and hyperlinked help system makes this interface easy to learn and easy to use. This powerful, productive interface gives you total control and flexibility in the configuration of the size, position, content, and color of each window.

The iceMASTER-PE includes a full symbolic and source-level debugger for Assemblers and Compilers. The emulator supports the most popular 8051 Assemblers and Compilers.

The iceMASTER-PE sets the standard for value in 8051-family emulation.

Ordering Information

PE-8031, PE-8032

Includes

Emulator, RS-232 cables, power supply, and *FREE* 8051 Macro Cross Assembler

Host System

IBM PC, XT, AT, 386, 486, PS/2, notebook, laptop, or a completely compatible system

Processors Supported

8031, 80C31, 8032, and 80C32

Available

Now!

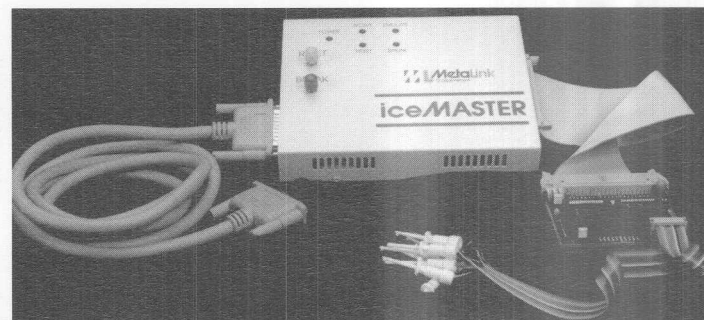
IM-8051/464

iceMASTER™-8051 Family of In-Circuit Emulators

- ▶ Full-featured, real-time and transparent emulator
- ▶ Supports 8051-family devices up to 24 MHz
- ▶ Provides interchangeable probe cards
- ▶ Can be hosted on any PC or compatible including laptops, notebooks, or PS/2 systems
- ▶ Provides 115 K baud serial link using a standard comm port
- ▶ Offers unlimited user support
- ▶ Hardware features:
 - 64 K program and 64 K external data memory
 - 4 K frame trace buffer
 - Advanced trace search ability
 - 128 K hardware breakpoints
 - 64 K trace ON/OFF triggers
 - Dual performance analyzers
- ▶ System features:
 - Efficient, powerful, easy to learn
 - Windowed user interface with control of size, content, position, and color
 - Third-party Assembler and Compiler support
 - Full symbolic and source-level debug
 - Full Intel 8051 derivative device support

Contact

Your local MetaLink sales office or distributor or:
 MetaLink Corporation
 325 E. Elliot Road
 Chandler, AZ 85225
 Tel: (602) 926-0797
 Fax: (602) 926-1198
 David Yeskey



Product Information

The iceMASTER-8051 emulator represents a culmination of over seven years of focused engineering to bring the most advanced semiconductor technologies to emulator design.

The iceMASTER-8051 emulators offer real-time and transparent emulation at up to 24 MHz for Intel derivative devices. Powerful breakpoint systems allow you to stop a program any time and examine all states and conditions. Trace memory provides a complete history of each event that has occurred, including source-level information, address, data, status, searching, external logic events, and a logical analyzer. The best performance-analyzer capability in the industry allows a thorough evaluation of the program to decide what areas are taking the most time and simplify those areas requiring improvement. The iceMASTER-8051 emulator supports symbolic and source-level debugging for the widest variety of third-party translators, including Cross Assemblers, 'C' Compilers, and PL/M Compilers. These capabilities allow you to debug your system the way you designed it, at the symbolic or source level. This increases your productivity, while decreasing your cost and time to market.

The iceMASTER-8051 emulators provide pull-down and pop-up menus, mouse support, function/hot keys, and context-sensitive hyperlinked HELP. The advanced color windowed user interface is easy to use. You can size, move, scroll, highlight, color-control, add or completely remove each window. You can also peruse and directly alter the contents of any memory space from the appropriate window, with multiple memory spaces displayed simultaneously.

Host System

IBM PC, XT, AT, 386, 486, PS/2, notebook, laptop or a completely compatible system

Processors Supported

8031, 80C31, 8x51, 8xC51, 8032, 80C32, 8x52, 8xC52, 8xC51FA, 8xC51FB, 8xC51FC, 80C51GB, 8344, and 8xC152JX.

A full range of NMOS, CMOS, EPROM, and OTP technology and process variations are supported.

Available

Now!



EMUL51-PC

EMUL51-PC

- ▶ Flexible user interface
- ▶ High-level debugging
- ▶ Standard and advanced source-level trace
- ▶ Performance analyzer
- ▶ Program performance specifications compiler support

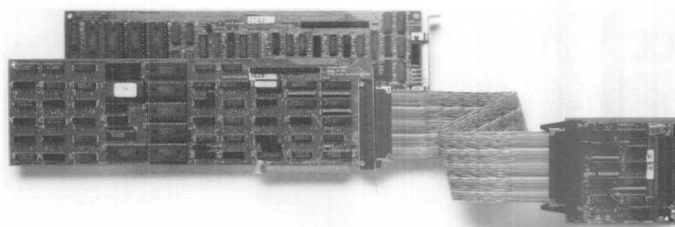
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Fax: 43 44 60 20

**Product Information**

The EMUL51-PC is a high performance in-circuit emulator specifically designed to give an optimized environment to develop your 8051 family hardware and software.

The EMUL51-PC emulator is a board which plugs directly into the IBM PC/XT/AT bus. As an alternative it can be installed in an expansion box with a 115 Kbaud serial interface to the host computer.

The optional trace board features an advanced trace function with sophisticated trigger capabilities. The POD, which plugs into the target system, is connected with a five feet (1.5 m) ribbon cable to the emulator board to provide a flexible operation range.

The EMUL51-PC is fast. A 16 K object and symbol file loads in less than two seconds.

EMUL51-PC is dedicated to the 8051 family. It truly emulates the microcontrollers from all manufacturers of 8051 derivatives. This means that your EMUL51-PC will work just like the microcontroller when placed in your target.

We call this a "no-compromise" design - a quality which has helped EMUL51-PC become the world's most popular 8051 family emulator.

Support

EMUL51-PC is supported by several user interfaces from third-party vendors:

- ChipView from ChipTools is key press compatible with Borland's debugger.
- tScope from Keil/Franklin is Code View-like
- CXDB from Intermetrics is XRay-like
- Soon under Microsoft Windows from Nohau

EMUL51-PC

(continued)

EMUL51-PC

Flexible User Interface

- ▶ Pull-down menus with mouse support and online help
- ▶ Code window for source-level debugging in C or PL/M
- ▶ Command line for fast command entry
- ▶ Support for abbreviated commands
- ▶ Context-sensitive help information
- ▶ Watch window for displaying any selected variable
- ▶ Data window for displaying internal RAM; new values can be entered directly into the window
- ▶ Stack window for displaying stack contents
- ▶ External data window for displaying and modifying XDATA memory

help	File	Disp/Alter	Setup	Trace	Breakp	Run	Macro	Win	misc	SourceDeb
P0	86	F3	F	RESET >				SCON	00	DPH 00
P1	FF	1F	E	ABS register bank select				SBUF	00	DPL 00
P2	FF	1E	6	WPC Map Code				PCON	7F	SP 61
[00] <- [00]				MAPX Map eXt data				REGS		
#98	(DOM Module domain						PC 0131
#100	int	counter	TS	Trace setup						ACC 00
#129	E4	CLR	25	25 line screen						B 00
#12A	F5	37	MOV	43 43 line screen						SP 61
#12C	F5	38	MOV	50 50 line screen						DP 0000
#101	struct	apan *								R0 00
#12E	75	39 05	MOV	39,005						R1 00
#131	75	3A 00	MOV	3A,000						R2 00
#134	75	3B D6	MOV	3B,D06						R3 00
#104	argc	= 10;								R4 00
#137	F5	22	MOV	22,A						R5 00
										R6 00
										R7 00
* 1				DATA	STACK	EXTERNAL DATA				
START EMULATION	0020:	00 00 00 00 00 00 00	61:00	4000:	02 40 00 00 22 0	CAF 000				
* 1	0020:	00 00 00 00 00 00 00	60:00	4000:	E6 AF EE CE FF 9	RS 00				
START EMULATION	0030:	00 00 00 00 00 00 00	5F:00	4010:	64 00 C0 CA 51 0	O-P 000				
*	0030:	00 05 00 00 00 00 00	5E:00	4010:	FF 7F FF ED FF F					

Map code memory in 4K portions (E=emulator, T=target system)

Product Information

One of the key features of the EMUL51-PC is its user-friendly interface. Pull-down menus, mouse support, and online help make infrequent users feel instantly at home. More experienced users will appreciate the fast command line interpreter and the comprehensive command set with powerful macros.

The EMUL51-PC is designed to save you debugging time. Therefore, all information regarding the microcontroller and your application software is available right on the screen. The windows are flexible in size and can be positioned anywhere on the screen. Of course, all setup information can be saved to a file enabling you to start an emulation session quickly with exactly the setup you had when you left it.

All commands are supported with context-sensitive help information. If you need further help, the whole manual is online, available with a keystroke.

Supported MCU's

The unique architecture of the EMUL51-PC, which uses standard microcontroller and "Bond-Out" chips for true hardware and software emulation, supports a wide range of microcontrollers. We add support for new chips continuously. Please call your EMUL51-PC vendor for the latest news.

EMUL51-PC

(continued)

EMUL51-PC High-Level Debugging

```

Help File Disp/Alter Setup Trace Breakp Run Macro Win nisc sOurcodeb
counter: 0
flags: (0, 2, 5, 1)
abc: "in main"
flags: four: 5

[00] < [00] CODE WINDOW. MODULE: TEST
#118: memmove(&Xnonkey,&MONKEY,sizeof(Xnonkey));
#119:
#120:   sign0 = sign3 = 0;
#121:   sign2 = sign1 = 1;
#122:
#123:   while(1) {
#124:     counter = count(pointer,counter);
#125:     argc++;
#126:   }
#127:
#128: }

* sym ? flags ?
DATA  ..TEST.flags
1 symbols, 0 line references
"

1 Help 2Screen 3CopyCmd 4ndWin 5Speed? 6OnOff 7rvCmd 8xtCmd 9oCurs10Reps

```

High-Level Debugging

Using a high-level language for code generation is a way to cut development time. Therefore, the EMUL51-PC gives full support for debugging directly in C-51 or PL/M-51 source code. This eliminates tedious symbolic debugging in assembly.

With EMUL51-PC, you can mark breakpoints directly in the source-code window and easily follow the program execution on the screen listing.

The screen window shows either the high-level language source code or the corresponding assembly code.

You can easily display or alter all variables, both local and global, in the watch window. Naturally all variables are displayed in the form in which they were declared. This way you can work directly with floats, arrays, pointers, and structures.

EMUL51-PC Source-Level Trace

```

-2176:   local_2 = 0xABCD;
-2168:   return arg_counter;
-2160: }
-2148:   argc++;
-2140: }
-2136:   while(1) {
-2136:     counter = count(pointer,counter);
-2112: {
-2112:   for (local_2 = 0; local_2 < 4; local_2++)
-2086:   arg_counter++;
-2078:   for (local_2 = 0; local_2 < 4; local_2++)
-2046:   arg_counter++;
-2038:   for (local_2 = 0; local_2 < 4; local_2++)
-2006:   arg_counter++;
-1998:   for (local_2 = 0; local_2 < 4; local_2++)
-1966:   arg_counter++;
-1958:   for (local_2 = 0; local_2 < 4; local_2++)
-1926:   strcpy(abc,"cnt");
-1886:   other_module(evan,&laban);
-1862: {
-1862:   long_i = 1234567L;
-1846:   return sune + *kalle;

```

Options: PgUp,PgDn,F4, <digits> F2-source/nixed, F3-frame/nixed,F6-Search,Esc

Source-Level Trace


The source-level trace comes with the optional trace board. It lets you record the program flow in real-time. The trace window displays the source code as it has been executed.

Stand-Alone Emulator

Using the expansion box is a way to use your EMUL51-PC outside a PC or PS/2. It communicates with the host through a 115 K baud serial interface, a parallel interface, or a modem.

Nohau also offers a wide range of adapters to make your emulator work in any target environment.

NOHAU
CORPORATION

(continued) 

EMUL51-PC

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EMUL51-PC

The Standard Trace Board

- ▶ Trace buffer size
 - 4 K or 16 K deep by 48 bits wide
- ▶ Trace data
 - Address/data bus, RD/WR/OP code fetch, interrupt level, two ports or up to 18 external signals
- ▶ Trace filter
 - Twenty qualifiers of 48 bits allow filtered information to be collected
- ▶ Triggers/breakpoints
 - Two sets of triggers with 10 qualifiers each. Trigger on AND/OR combinations of the qualifiers
- ▶ Two trigger levels
- ▶ 16-bit loop counter
- ▶ Trace display
 - High-level language source, disassembled symbolic or binary/hex format

Trig: Yes, if s0 and s1 and s2 and s3 and s4 and s5
 Delay: 32768 LoopCount: 10 Break emulation: No Resol: 0.50µs
 Record: ALWAYS
 Filter delay: 0 Timestamp prescaler: NONE Timestamp overflow: OFF

Cycle count enable. S5=set a and s0 and s1 and s2 and s3 and s4 and /s5 clear a
 POD Signal "ANB". S4=set a and s0 and s1 and s2 and s3 and /s4 clear a and s0
 Loop counter condition. S3=set a and s0 and s1 and s2 and /s3 clear a and s0
 S2=set a and s0 and s1 and /s2 clear a and s0 and s1 and s2
 S1=set a and s0 and /s1 clear a and s0 and s1
 S0=set a and /s0 clear a and s0

ACTIVE?	ADDRESS	A	FWR	SY	INT	A	Data	A	P1	A	P3
a = YES	200	01	XX	XXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
or no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
b = no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
or no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
c = no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
or no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
d = no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
or no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
e = no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
or no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX
f = no	XXXX	XXXX	XXXX	XXXX	XX	XX	XXX	XXXX	XXXX	XXXX	XXXX

Specify conditions for individual state bit.

Product Information

The most efficient way to catch elusive or intermittent bugs is to use a good trace. The Standard Trace Board gives you a powerful set of trace tools. The trace can be operated on-the-fly, which means it can be viewed, programmed, and retriggered without disturbing program execution.

Up to 16 K bus cycles can be stored in the trace buffer. With the filter function, you can specify exactly what events are to be stored, thereby virtually increasing the trace depth.

The trace trigger can be used to stop the tracing or to generate a program breakpoint. The trigger can be generated at a selected event or after a combination of multiple events. By aligning the trigger point in the trace buffer, you have a full choice of pre- and post-triggering.

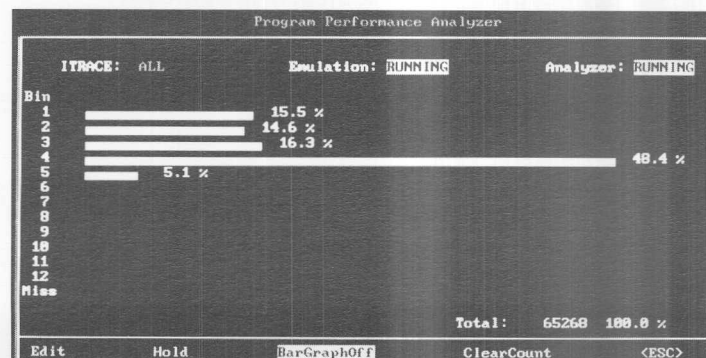
The recorded data can be viewed in several ways: as high-level language source code, in disassembled symbolic format, or in binary/hex format. With the binary/hex format, the status of up to 18 external signals can be displayed—just like a logic analyzer. The built-in search functions make it easy to find what you are looking for in the trace buffer.

Program Performance Analyzer

Optimize your software with the Program Performance Analyzer.

This nonintrusive product uses the power of the trace board to show you where your program spends its time. It helps you identify software bottlenecks or the time-consuming parts of our program.

You can view statistical histograms of programs in real-time. The EMUL51-PC divides program space into two categories and plots the percentage of time spent in each category.



(continued)

EMUL51-PC

(continued)

EMUL51-PC

The Advanced Trace Board

- ▶ Trace buffer size
 - 64 K or 256 K deep by 64 bits wide
- ▶ Trace data
 - Address/data bus, RD/WR/OP code fetch, interrupt level, two ports or up to 18 external signals
- ▶ Time stamp
 - 32-bit resolution with 16-bit prescaler
 - Times from 182 ns to years
- ▶ Trace filter
 - 16 qualifiers of 48 bits allow filtered information to be collected
- ▶ Trace triggers/breakpoints
 - Two sets of triggers with 10 qualifiers each. Trigger on AND/OR combinations of the qualifiers
- ▶ 64 trigger levels
- ▶ 16-bit loop counter
- ▶ 32-bit timer/counter
- ▶ Trace display
 - High-level language source, disassembled symbolic or binary/hex format

Trig: Yes, if s0 and s1 and s2 and s3 and s4 and s5												
Delay: 32768 LoopCount: 18 Break emulation: No Resol: 0.50ps												
Record: ALWAYS												
Filter delay: 0 Timestamp prescaler: NONE Timestamp overflow: OFF												
Cycle count enable. S5=set a and s0 and s1 and s2 and s3 and s4 and /s5 clear a												
POD Signal "AMB". S4=set a and s0 and s1 and s2 and s3 and /s4 clear a and s0 a												
Loop counter condition. S3=set a and s0 and s1 and s2 and /s3 clear a and s0 a												
S2=set a and s0 and s1 and /s2 clear a and s0 and s1 and s2												
S1=set a and s0 and /s1 clear a and s0 and s1												
S0=set a and /s0 clear a and s0												
	ACTIVE?	ADDRESS	A	FWR	SY	INT	A	DATA	A	P1	A	P3
A	= YES		280	01	XX	XX		XXXX XXXX XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
	or no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
B	= no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
	or no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
C	= no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
	or no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
D	= no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
	or no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
E	= no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
	or no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
F	= no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
	or no	XXXX XXXX XXXX XXXX	XX	XX	XX		XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX	XXXX XXXX
Specify conditions for individual state bits.												

Specify conditions for individual state bit.

Product Information

The optional Advanced Trace Board has all the features of the Standard Trace Board plus several extra features. It lets you record up to 256 K bus cycles. For each cycle there is a 64-bit sample of address/data bus, RD/WR/OP code fetch, interrupt level, two ports or up to 18 extra signals, and a time stamp. The time stamp shows exactly when a frame has been recorded, making it easy to measure the time of functions and events.

There is also an extra 32-bit timer for measuring events on-the-fly.

The built-in state-event machine lets you define triggers, breakpoints, and data filters using Boolean combinations of events, counters, and states. This means that the most complex bugs can be traced and identified. For example, you can program the trace to collect information on the data bus 23456 times after a certain input has occurred and a specified sequence of program modules has been executed.

EMUL51-PC

EMUL51-PC System Specification

Host

- IBM PC/XT/AT, PS/2 or compatible
- Minimum 512 K of RAM
- Monochrome, CGA, EGA or VGA in 25-, 43-, or 50-line mode
- Macintosh, Sun, or other workstation

External Box

The emulator boards can be installed in an external box with serial or parallel communication to the host computer.

Languages Supported

- Third-party assemblers, C-51, PL/M, Pascal, and Modula-2 compilers

High-Level Debugging

- Window for source-level debugging
- Single Step or Line Step with breakpoints marked directly in the code
- Full support of local and global variables in C-51
- We currently support Franklin/Keil, Archimedes/IAR, Intermetrics/Whitesmiths/Cosmic, and BSO/Tasking.

In-Line Assembler and Disassembler

- Full instruction set and symbols supported

Symbolic Support

- Full symbolic debugging and type checking
- Same symbols can be used in different modules
- All special functions registers supported

File Formats Supported

- Intel HEX/OBJ/OMF/SYM
- Avocet
- Archimedes/IAR
- Keil/Franklin
- 2500 AD
- Intermetrics
- BSO/Tasking and many more

Execution Timer

- Resolution down to 182 ns

Real-Time Emulation

- Full-speed emulation up to 33 MHz
- No wait states and no intrusion on memory, stack, I/O or interrupt pins

Emulation Memory

- 64 K XDATA memory and 64 K CODE memory
- Up to 320 K bank switched memory as option
- Memory mapping
- Mappable in 4 K pages

Macros

- Test session automation and macro command definition
- IF/ELSE, REPEAT/WHILE structures

Debug Session Logging

- Record emulation session and all setups to a file

Breakpoints

- 64 K program breakpoints. Breakpoints can be selected to break before or after execution of the breakpoint instruction.
- 64 K data read and 64 K write breakpoints
- Break on external signal
- Break on direct access to internal bit or byte memory
- Break on range of addresses and high-level language statements
- Break on program execution out of boundaries
- With the trace board option, it's possible to break on any 48-bit combination of address, data, RD, WR, OP code fetch, interrupt level, ports, or external signals.

Single Stepping

- Single or multiple instruction stepping
- Step over calls and interrupts
- Line stepping in high-level languages

Ordering Information

See contact information located on the first page of Nohau product line.

NOHAU
CORPORATION

8620

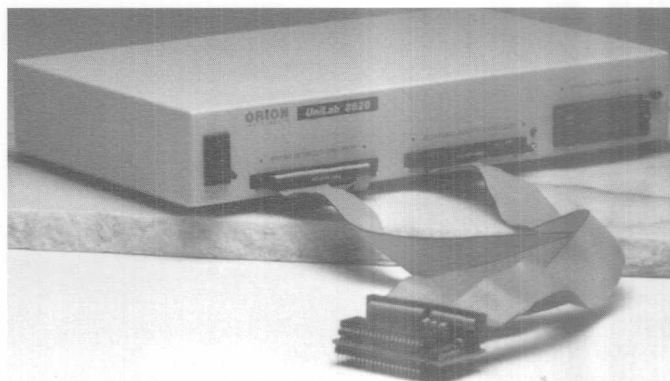
UniLab 8620 Analyzer-Emulator

- ▶ Full-speed, zero-wait-state support up to 24 MHz.
- ▶ 2.7K trace can be viewed without stopping or affecting the target; ideal for real-time embedded control systems
- ▶ Triggering dialog box for fast trigger creation
- ▶ 128K emulation memory option handles bank-switching
- ▶ CXDB source-level debugger
- ▶ Multiple breakpoint and single-stepping options
- ▶ Fast program download (64K in under 3 seconds)
- ▶ Superior macro capabilities
- ▶ Built-in EPROM programmer
- ▶ Pop-up menu or command-driven

Contact

Orion Instruments, Inc.
180 Independence Drive
Menlo Park, CA 94025
Tel: (800) 729-7700 or (415) 327-8800
Ask for corporate sales
Fax: (415) 327-9881

ORION[®]
INSTRUMENTS



Product Information

Orion's PC-based UniLab 8620 is a cost-effective, real-time development system for 8051 microcontrollers. The 8620 never slows the processor with wait-states, and its trace buffer can be viewed at any time, without having to stop at a breakpoint. This makes it particularly well-suited for real-time embedded control systems where the invasiveness of breakpoints disrupts system timing. A smart disassembler together with sophisticated triggering, filtering, and trace management make trace analysis fast and easy.

Symbolic debug and high-level language support are standard and work with Intel and other third-party assemblers and compilers. In addition, the 8620 supports both "step-into" as well as "step-over" single-stepping. As an option, you can take advantage of an emulator version of Whitesmiths' CXDB source-level debugger. This provides a powerful, multiwindowed source-level debugger with full local variable support and symbolic stack tracing.

An extremely powerful macro capability lets you create custom commands and features. Macros can include DOS batch files, so you can automate the recompile, link, and load cycle for more productive program development.

In addition to the MCS[®]-51 family, the 8620 base unit supports more processors than any other development system. Processors supported include the MCS[®]-96 family, 80C186, 68HC11, Z80/64180, 6502, and many more.

For intensive hardware debug and mixed-signal problems, Orion offers the OmniLab 9000 series, an integrated PC-based instrument featuring time-aligned displays of both digital and analog events, including disassembly. See the listing under Orion 9350 for more info.

Processors Supported

8031, 80C31, 8032, 80C32, 8051, 8051, 80C51, 8052, 80C52, 8751, 87C51, 8752, 87C52, 80C51FA, 8044, 80C54, 80C58, 80C51VS, 85C154VS, 80C321, 80C521, 80533, 80C528, 80C652, 80C851, 80C152JA/JC, 80C152JB/JD, 80C451, 80C452, 80532, 80C532, 80535, 80C535, 80C537, 80C552, 80C562, and 80C592

Host Systems Supported

PC compatibles

Ordering Information

Complete UniLab 8620 systems are priced at \$3,495.
Available now. Immediate delivery.

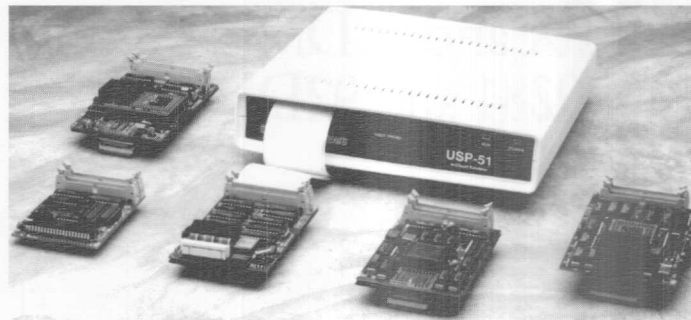
USP-51

USP-51 In-Circuit Emulator

- ▶ Real-time emulation up to 42 MHz
- ▶ Real-time access to program, external data memory, and trace
- ▶ HLL debugging in C and PL/M
- ▶ 32 K by 80-bit trace buffer
- ▶ Up to 256 K of program memory
- ▶ Breaks on internal memory and SFRs
Complex hardware breakpoints
- ▶ Performance analysis
- ▶ The best user interface in the industry

Contact

SIGNUM SYSTEMS
171 E. Thousand Oaks Blvd., #202
Thousand Oaks, CA 91360
Tel: (415) 903-2220 or (805) 371-4608
Fax: (415) 903-2221 or (805) 371-4610
Email: Attmail!Signum



Product Information

The Signum Systems USP-51 gives you true real-time in-circuit development and debugging at any level, machine code to C and PL/M. You can watch variables change on-the-fly, and zoom in on a member of a local complex structure with just a click of a mouse. Signum Systems has engineered emulators to the highest standards since 1979, and it is our policy to provide free customer support along with free software/firmware updates. That means Signum has an economic imperative to deliver precise and dependable instruments and the experience to make it possible.

Like all Signum emulators, there is no confusing list of options to configure. The USP-51 comes complete with high-level debugging that works with your favorite compiler, an 80-bit wide by 32 K deep trace, and debugging features that cost extra on most other emulators.

Extensive use of dual-ported RAM means you have access to all emulation memory, captured trace, and trace triggering without intruding on your design. And our windowed interface makes it easy to use. You can use the command line interface, or just point and click. Sampling trace allows you to capture only meaningful data. Complex breakpoints with an eight-level sequencer, two 16-bit pass counters, and an external trigger make this tool indispensable in any MCS[®]-51 embedded application.

Call for detailed specifications and a demo disk.

Ordering Information

- All units include 128 K memory, 32 K by 80-bit trace, HLL debugger for C and PL/M, and free technical support.
 - USP-51 for up to 20 MHz \$3,995
 - USP-51/32 for up to 32 MHz \$4,295
 - USP-51/42 for up to 42 MHz \$4,995
- 22 PODs for most 8051 members are available now.
- Most PODs emulate several microcontrollers.
- Call our sales office for a complete list of devices.

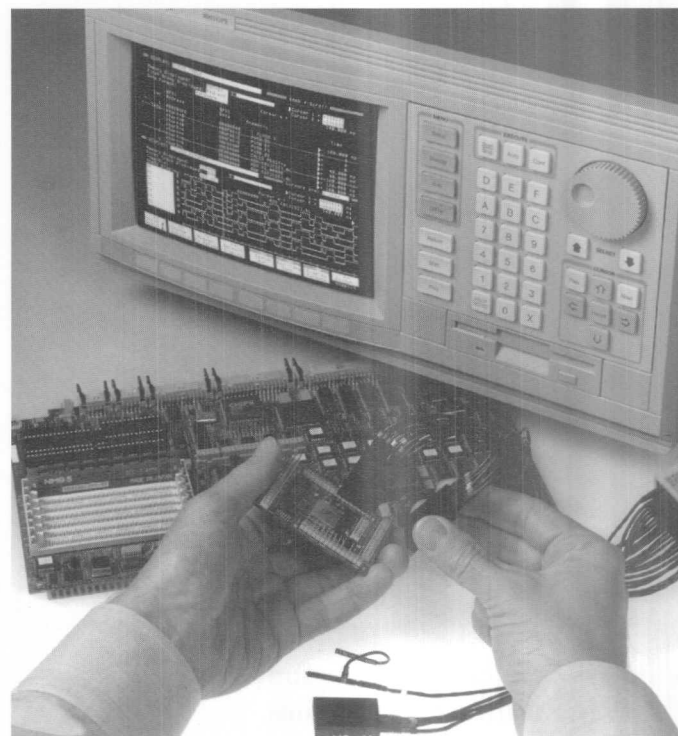
SIGNUM SYSTEMS

32GPX and 32DM01 DAS9281 and 92DM901

- ▶ Real-time symbolic debug of MCS[®]-51 architecture systems
- ▶ Trace identifies instructions actually executed and branches taken
- ▶ Single connection probe adapters for most MCS[®]-51 architecture devices
- ▶ 80-to 100-MHz state acquisition
- ▶ Timing analysis on all channels through same probe adapter
- ▶ ROM emulation
- ▶ Real-time performance analysis
- ▶ Links to high-level languages
- ▶ Prices start at \$9,000

Contact

Tektronix, Inc.
National Marketing Center
P.O. Box 4600 M/S 94-860
Beaverton, OR 97076
Tel: (800) 426-2200



Product Information

The GPX Logic Analyzer is a general-purpose instrument with features for everyone on the design team. Complete systems for microprocessor analysis start at \$9,000. The GPX series comes in a 3001GXP monolithic unit or a 3002 modular mainframe. Both units offer a 64-MB hard disk and an MS-DOS compatible floppy for data storage, keyboard, and a variety of monochrome and color displays. The GPX offers 80 to 160 channels of 80-MHz state acquisition; 200-MHz transitional timing analysis on all channels; 16 to 32 channels of 1-GHz timing acquisition (40 K deep); true simultaneous state and timing analysis without double probing; ROM emulation; real-time performance analysis; and links to high-level languages such as C, C++, Pascal, and Ada.

The DAS9200 Digital Analysis System is a modular instrumentation platform that you can operate locally using a color X-terminal or from a workstation via a standard X11/R4 server. Host communication is supported via LAN, RS-232, or GPIB. CENTURION is a family of highly integrated DAS9200 acquisition modules designed specifically to address the demanding requirements of the fast, wide, complex buses of today's microprocessors. The 96 channels of 100-MHz synchronous acquisition on each module lets you use multiple modules to support multiple microprocessors with no compromises in speed or timing. Memory depths from 8-K samples to 512-K samples lets you capture both the symptom and cause of complex problems. The DAS9200 offers software performance analysis at full speed with up to 5,000 symbolic ranges.

Tektronix



MCS[®]-96 Architecture

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CheckMate-C196K™

CheckMate-C196K™
Emulator

- ▶ 16 MHz operation standard to support KC and KD targets
- ▶ 10MB-per-second communication speed
- ▶ Plug-in and run operation; fully supports Intel's ONCE™ mode.
- ▶ Does not use target ADDRESS or I/O space, Target Interrupts, or Stack space
- ▶ Windowed Source Level Debug interface standard
- ▶ Complete hardware event system has two ADDRESS comparators, one DATA Comparator, and instruction STATUS to trigger breakpoint or trace
- ▶ 1 K trace memory qualified by hardware event system
- ▶ 64 K overlay memory standard
- ▶ PC/AT or above hosted

Contact

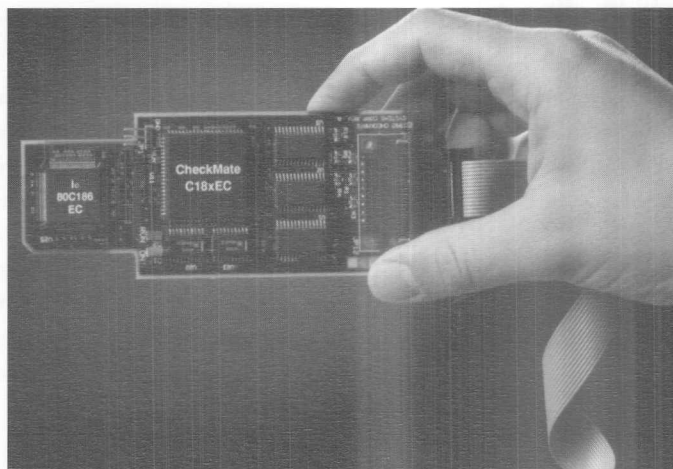
Mailing Address:
P.O. Box 3361
Redmond, WA 98073

Shipping Address:
15225 N.E. 90th Street
Redmond, WA 98052

North America, Asia, and Europe (other)
Checkmate Systems
Tel: 206-869-7211
Fax: 206-861-3647

Europe (Germany)
D=Systems GmbH
Tel: 49-813-125083
Fax: 49-813-114024

Europe (U.K.)
Great Western Instruments
Tel: 44-272-860400
Fax: 44-272-860401

**Source-level Debug Environment**

CheckMate-C196K™ comes complete with our own, windowed source-level debugger interface. Our entire emulator feature set is available directly in the debug environment. Of course, this means that CheckMate-C196K™ is compatible with all code generated from any languages that output OMF-96.

Rich Feature Set**Hardware Event System and Breakpoints**

CheckMate-C196K™ provides features that only expensive emulators could in the past. A hardware event system gives you complete hardware breakpoint and trace ON/OFF control. The event system contains ADDR and ADDR RANGE comparators, a DATA comparator that can be masked to the individual bit, and a STATUS comparator. The comparators can be used in any breakpoint combination. Software, "ADDR only", breakpoints are also available. In addition, events can be defined using READ or WRITE on the internal RAM and SPR bus.

Trace Memory

The 1 K trace buffer captures all bus traffic with ADDR, DATA, and STATUS information. The CheckMate™ hardware event system can also qualify the contents of the trace memory to the individual instruction. A unique feature disables trace over a specified ADDRESS range so the operating system or kernel code is ignored.

Overlay RAM

Overlay memory comes standard with 64 K and it may be mapped to either internal ROM or external memory. This memory is Ø wait state at 16 MHz target clock operation.

Ordering Information

Contact factory for pricing. Available 2nd half 1993.

*fuzzy*TECH

*fuzzy*TECH fuzzy logic development system

- ▶ Integrates fuzzy logic in every embedded design
- ▶ Includes all graphic design tools
- ▶ Generates ANSI C code with various optimizing options
- ▶ Generates assembly code for MCS[®]-96, MCS[®]-51
- ▶ Runs with MS-Windows 3.0 or later
- ▶ Provides various graphical simulator features and analyzer tools
- ▶ Provides online technology for optimization on the fly
- ▶ Includes full engineering and design support by INFORM's project teams

Contact

Inform Software Corporation
1840 Oak Avenue
Evanston, Illinois 60201
Tel: (708) 866-1838
Fax: (708) 866-1839 and (708) 866-1808



Product Information

FUZZY LOGIC is a technology that enhances model-based system designs using both intuition and engineering heuristics. Fuzzy logic gives you the chance to represent the desired system behavior using elements of everyday language, thus circumventing the need for rigorous mathematical modeling.

FUZZY LOGIC systems can be fast even on standard micro-controllers using *fuzzy*TECH. A fuzzy logic system consisting of 20 rules computes in less than 0.34 ms on an 80196/20 MHz, taking only 0.73 KB of ROM. Even with an 8051/12 MHz, this system can be computed in less than 1.7 ms using 0.52 KB of ROM.

THE *fuzzy*TECH software workbench lets you design, simulate, and optimize a fuzzy logic system graphically without seeing a single line of code. Various graphical analyzer tools assist you in debugging your fuzzy logic system. The online edition enables fuzzy-control strategies to be developed and optimized in real-time on a running system.

INFORM also offers engineering support from transferring technology to producing full-blown applications and products in a cooperative effort.

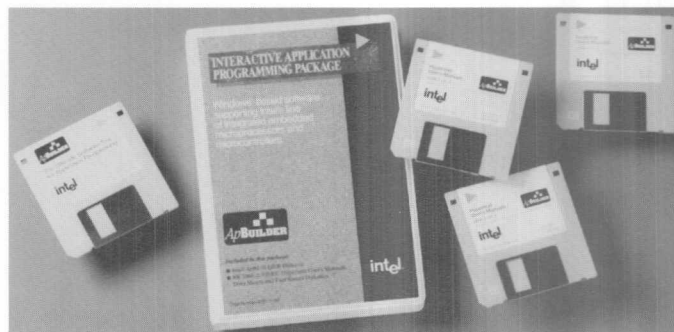
ApBUILDER

ApBUILDER Interactive Application Programming Package

- ▶ Support for MCS[®]-96 and 186 architectures
- ▶ Online peripheral programming
- ▶ Hypertext reference document
- ▶ Online data sheets and fact sheets
- ▶ Windows screens for ease of use
- ▶ Assembly instruction syntax editor
- ▶ Common Q & A support
- ▶ And...it's *free*!

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Become an Architectural Wizard Instantly

ApBUILDER is a powerful new design tool for the embedded control applications programmer. This product was created specifically to speed up your learning curve and reduce your total design time, no matter what level of processor experience you have. ApBUILDER software provides you with peripheral design capabilities, an interactive instruction and register editor, a click-on highlight feature, and a hypertext utility for hardware reference manuals.

The ApBUILDER programmer package saves you time and energy by providing a simple mechanism for configuring an embedded processor. And it's flexible, too. It has a design section that allows you to select the functionality of each integrated peripheral. If you want to program a specific register, ApBUILDER software provides the online capability of picking and choosing the bits you want to set within the register itself. In both cases, ApBUILDER software converts your selection into usable assembly-language code.

ApBUILDER's block diagram screens give a graphic overview of the unique features of a selected device. By giving you the ability to view multiple products quickly and easily, ApBUILDER software becomes a valuable tool in helping you choose which processor is best suited for your application.

Multiple hypertext windowed utilities are organized throughout the ApBUILDER software, enabling you to access an extraordinary amount of data quickly and easily. With the click of a button, you have access to hardware reference manuals, data sheets, fact sheets, answers to commonly asked questions, and general help information. ApBUILDER enables you to focus on your application rather than wasting time programming bit by bit.

Personal Computer Requirements

ApBUILDER requires an IBM or BIOS-compatible 386 PC or above, a VGA monitor, 16-Mbyte hard disk, 1.44-Mbyte floppy-disk drive, 4 Mbytes RAM, a mouse, and Windows 3.0 or later.

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request FaxBACK[™] document #2589.

ProjectBUILDER196

ProjectBUILDER196 Development Kit for 196KB/KC/KD

- ▶ Windows development environment
- ▶ Application modeling software
- ▶ Performance-analysis software
- ▶ Retargetable windows debug monitor
- ▶ Expert system programming tool
- ▶ Hypertext product manuals
- ▶ Demo macro assembler—ASM-96
- ▶ Target board with 20 MHz 87C196KD
- ▶ OrCAD schematics and library
- ▶ ...At a petty cash price!

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor.

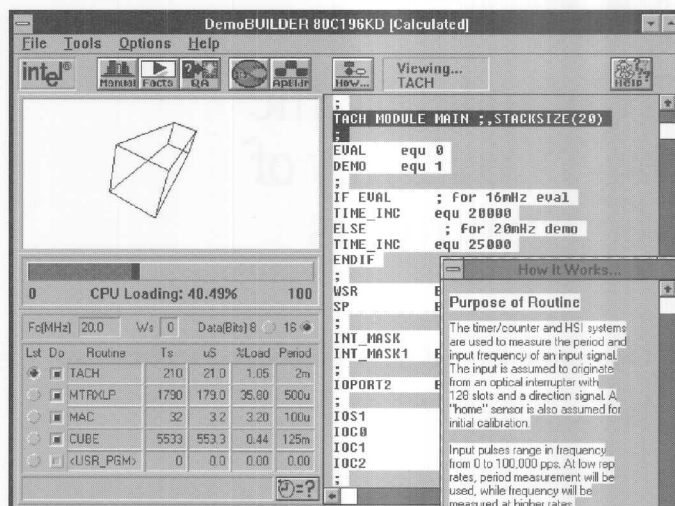
For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*™ document #2589.

Order code: PROJBLD 196KBCD

Product Available: 6/93

For free demo software call:

Intel Literature
U.S. & Canada: (800) 468-8118
U.S. Literature order No. 272329



Product Information

ProjectBUILDER196 is a low-cost kit that answers the design engineer's question: "How well does the Intel MCS®96 embedded controller work in my application?" The *ProjectBUILDER196* software allows you to create a system-level model of your application without writing a line of code. Use your mouse to select any of nine configurable performance templates. For a highly refined performance analysis, load one module of your own application code into *ProjectBUILDER196*, and combine it with your model. Use the model to explore hardware design "what if" scenarios with pull-down menus and screen buttons to change memory wait states, address bus width, and CPU frequency.

When you begin your application, use *ApBUILDER*, a powerful expert system programmer's tool for Intel's embedded controllers. It generates both C and ASM code while mapping everything programmers need to each development screen. Programming masks prevent mistakes. You can develop an application without prior knowledge of the MCS®96 architecture.

Download your programs from your PC serial port at 57.6 K baud to the target board for real-time savings. The board has a 20-MHz 196KD embedded controller and can operate as a stand-alone system. Program your application into FLASH or EPROM and use the board interface connectors for high-speed input/output interface, analog inputs, digital inputs/outputs, and external memory. The symbolic debug monitor can also be retargeted to your design prototype. The monitor kernel is configurable for Intel's 196KB, KC, and KD *at any processor speed!*

Personal Computer Requirements

ProjectBUILDER196 requires an IBM or BIOS-compatible 386 PC or above, a VGA monitor, 1.44-Mbyte floppy-disk drive, a minimum of 2 Mbytes RAM, a mouse, and Windows 3.0 or later.



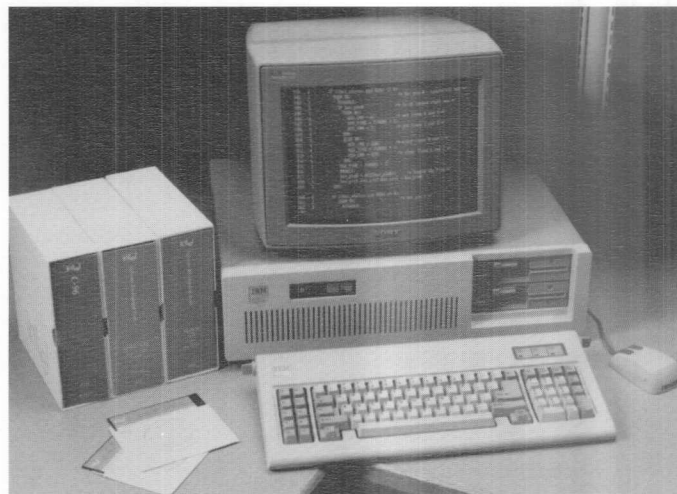
iC-96

iC-96 C Compiler for the MCS[®]-96 Family of Microcontrollers

- ▶ Optimized for real-time, embedded applications
- ▶ In-line assembler
- ▶ Architecture-specific directives
- ▶ Closely conforming to the ANSI C standards
- ▶ Interrupt routines can be written in C, via INTERRUPT attribute
- ▶ Extensive debug information, including symbolics
- ▶ Re-entrant and non-re-entrant attributes
- ▶ Compatible with ASM-96 and PL/M-96

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Product Information

iC-96 is a structured programming language designed to support applications for the family of MCS[®]-96 microcontrollers. It is a C cross compiler closely conforming to ANSI C standards. iC-96 code is linkable with both PL/M-96 and ASM-96 modules via an ALIEN attribute. This allows you to use the optimal language for any application. iC-96 generates code that is optimized for the MCS[®]-96 architecture. It provides an INTERRUPT attribute that allows you to define interrupt handlers in C. Library routines allow you to enable and disable interrupts directly from C. A REENTRANT/NONREENTRANT control included in the compiler allows the compiler to identify procedures appropriately, thus making efficient use of the large MCS[®]-96 register set. With the in-line assembly feature, you can embed assembly-language instructions within your C code for added programming power and flexibility. The iC-96 compiler boosts programmer productivity by providing extensive debug information, including symbols. Debug information can be used to debug application code using in-circuit emulators that support the OMF-96.

The iC-96 package also includes the Linker/Locator, Librarian, Floating-Point Library, and Object-to-hex converter utilities. These are described on the ASM-96 product description page.

Host

DOS V3.3 or later

Ordering Information for D86C96NL

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*[™] document #2589.

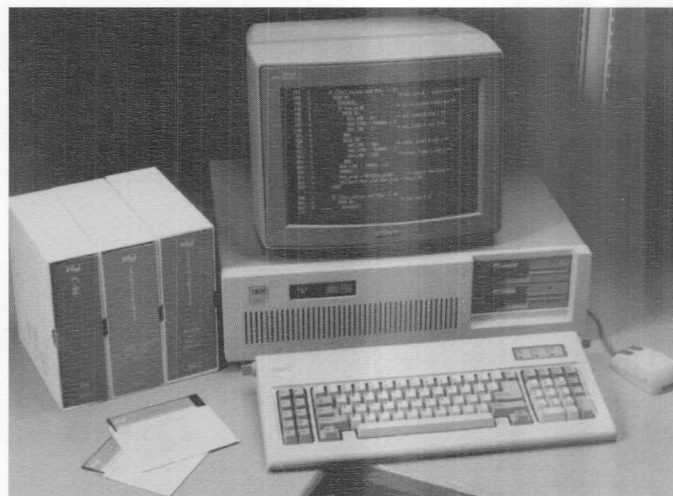
PL/M-96

PL/M-96 PL/M Compiler for the MCS[®]-96 Family of Microcontrollers

- ▶ Modular and structured programming support
- ▶ Extensive built-in functions provided
- ▶ Interrupt handling procedure definitions
- ▶ Compile-time options to increase flexibility
- ▶ Seven data types supported
- ▶ Object modules compatible with other languages

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

PL/M-96 is a high-level programming language designed to support the software requirements of the MCS[®]-96 microcontroller family. The compiler translates high-level language statements into relocatable object code. Here are some features of the PL/M-96 compiler:

- The PL/M language supports modular and structured programming, making programs easier to understand, maintain, and debug.
- PL/M-96 includes an extensive list of functions including TYPE CONVERSION functions, STRING manipulations, and functions for interrogating MCS[®]-96 hardware flags.
- The INTERRUPT attribute allows you to easily define interrupt handling procedures. The compiler will generate code to save and restore the program status word for INTERRUPT procedures.
- Compile-time options increase the flexibility of the PL/M-96 compiler. These controls include optimization, conditional compilation, the inclusion of common PL/M source files from disk, cross-reference of symbols, and optional assembly-language code in the listing file.
- PL/M-96 supports seven data types, allowing the compiler to perform three different kinds of arithmetic: signed, unsigned, and floating-point.
- PL/M-96 object modules are compatible with object modules generated by Intel MCS[®]-96 language translators. This compatibility allows for easy linking of all modules and the ability to do symbolic debugging with various in-circuit emulators.
- The PL/M-96 package also includes the Linker/Locator, Librarian, Floating-Point Library, and Object-to-hex converter utilities. These are described on the ASM-96 product description page.

Host

DOS V3.3 or later

Ordering Information for D86PLM96NL

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*[™] document #2589.

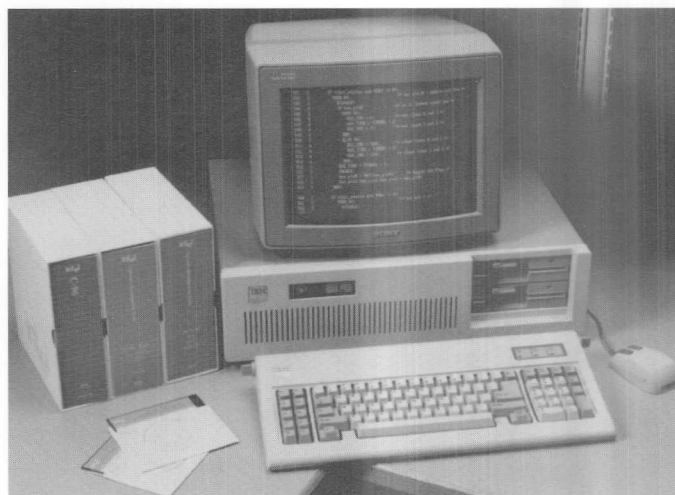
ASM-96

ASM-96 Assembler for the MCS[®]-96 Family of Microcontrollers

- ▶ Offers full instruction set for all MCS[®]-96 components
- ▶ Supports symbolic access to the MCS[®]-96 family features
- ▶ Provides include files with predefined registers
- ▶ Macro facility saves development and maintenance time

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

ASM-96 is the macro assembler for the MCS[®]-96 family of microcontrollers. The assembler translates symbolic assembly language mnemonics into relocatable object code. The macro facility in ASM-96 saves development and maintenance time, since common code sequences need only be developed once. The assembler also supports symbolic access to the many features of the MCS[®]-96 microcontroller and provides an include file with all MCS[®]-96 registers defined.

Utilities

The ASM-96 assembler package includes the following utilities:

- Linker/Locator, for linking multiple MCS[®]-96 object modules into a single program and then assigning absolute addresses to all relocatable addresses in the new program. Object module can be of sources written in ASM-96, PL/M-96, or iC-96. The utility also promotes programmer productivity by encouraging modular programming. Because applications can be broken into separate modules, they're easier to design, test, and maintain. Standard modules can be used in different applications, saving software development time.
- Librarian, for creating and maintaining libraries of object modules. Standard modules can be placed in a library and linked to your application via the Linker/Locator.
- Floating-Point Arithmetic library, a library containing single precision 32-bit floating-point arithmetic functions, such as division and square root. It adheres to the IEEE floating-point standard for accuracy and reliability.
- Object-to-hex converter, for converting object modules into standard hexadecimal format, allowing code to be loaded directly into PROM using industry-standard PROM programmers.

Host

DOS V3.3 or later

Ordering Information for D86ASM96NL

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request FaxBACK[™] document #2589.

MCS[®]-96 Cross-Assembler MCS[®]-96 Simulator-Debuggers

- ▶ Low-cost, fast, and efficient MS-DOS cross-assembler with total MCS[®]-96 instruction-set support, fully symbolic, with conditional assembly; produces Intel formatted hex object code
- ▶ Multiple screen simulators with built-in stand-alone disassemblers
- ▶ User-interactive operation with easy-to-learn keyboard commands
- ▶ Instructions can be executed in single step, continuous interruptible mode, or between user-defined breakpoints
- ▶ Complete I/O simulation including serial communications
- ▶ Full interrupt support; incoming external signals are simulated with the use of "F" keys that act as debounced switches when pressed
- ▶ Special dedicated I/O screen shows the contents of the HSO CAM File, HSI FIFO, and eight A-D channels
- ▶ SIM196KC supports Vertical Windows and the new Peripheral Transaction Server (PTS)

Contact

Lear Com Company
2440 Kipling St., Ste. 206
Lakewood, CO 80215
Tel: (303) 232-2226
Fax: (303) 232-8721

Lear Com Company

96XASM, SIM196KB, and SIM196KC

LEARN COM 80C196KC SIMULATOR-DEBUGGER VER 1.0 Copyright (c) Louis E. Archilla															
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
10	-	C1	DB	00	20	00	00	00	00	00	02	00	00	00	00
20	-	20	00	00	00	00	00	00	00	00	00	00	00	00	00
30	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
40	-	00	03	A0	10	A0	12	10	00	00	00	00	00	00	00
50	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
60	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
80	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
90	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
A0	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
B0	-	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Breakpoints @: 3000,3A40,3FC8															
T-States=00001611 F2=001000 T1=00C9 T2=0064 Trace=OFF															
PSEL=[0000] PFSK=[0000] PWD=[00] PWL=[00] PW2=[00] IDC2=0 0 0 0 0 0 0 0															
P0=[00] 00000000 P1=[FF] 11111111 P2=[C4] 11000001 IOC3=1 1 1 1 0 0 1 0															
BSL 0=[1] BSL 1=[0] BSL 2=[0] BSL 3=[0] MUI=[0] IOS0=0 0 0 0 0 0 0 0															
BS0 0=[0] BS0 1=[0] BS0 2=[0] BS0 3=[0] WSR=[00] IOS1=0 0 0 0 0 0 0 0															
HSOIM=[1400] ADRES=[7FFF] T2CAP=[0000] T2CLK=[16] IOS2=0 0 0 0 0 0 0 0															
ESTIM=[0000] ADTIME=[80] SBUF/T2=00 SBUF/RS=00 PIR=00 SP=0200 TDX=2500															
RC = 20A5 27EE SBUF 20A5E															
20A7 F4 PUSH															
20A9 B12020 LDB 20B, #20E															
Command:															

Cross-Assembler

You can run MCS[®]96 source programs of unlimited length, generated with the use of any ASCII editor or word processor, through our 96XASM to generate absolute Intel hex object code and an optional list file with cross-reference symbol table. The assembler is fully symbolic, and the instruction-set mnemonics are totally compatible with Intel's, including the additional ones unique to the 80C196KC family.

Simulator-Debuggers

Our line of MCS[®]96 screen-based simulator-debuggers offers you a superb, cost-effective development and learning tool with versions for the basic 8096, 80C196KB, and 80C196KC families of embedded controllers (SIM96, SIM196KB, and SIM196KC).

The input to the simulators is the Intel hex file, as produced by any compiler or assembler. When first invoked, the Main Simulator Screen is displayed in the format shown above. There are four additional interactive screens: the Disassembler Screen; the Object Code Screen (up to 64 K); the Internal Data RAM Screen (256/512 bytes); and the Auxiliary I/O Screen, where the current status of the HSO CAM File and HSI FIFO can be examined. Also, the eight channels of the A-D unit can be loaded with user-defined input voltages for A-D simulation.

System Requirements

- MS-DOS
- PC-DOS with 256 K or more RAM
- Color or monochrome display
- MS-DOS 3.0 or higher

Controllers Supported

- 8096
- 80C196KB
- 80C196KC

8096_qualBUG 805X_qualBUG

- ▶ Quick and easy to learn
- ▶ Easy-to-read views and reports
- ▶ Fast debug of interrupts and I/O
- ▶ Increase code performance
- ▶ Improve code quality
- ▶ Expand hardware test coverage
- ▶ Use your own compiler
- ▶ Document binary code

Contact

Jim Kelley
MicroView
San Jose, CA.
Tel/Fax: (408) 356-3222

8096_qualBUG 805X_qualBUG

Product Information

MicroView's 8096_qualBUG is a new generation of Windows compliant tools targeted at improving the measurable quality in firmware, software, and hardware development of embedded microproduct. The 8096_qualBUG product lets you write and execute your program interactively, but it goes way beyond this by providing the tools necessary to reconstruct undocumented PROM code to measure the completeness and effectiveness of the product test. These tools help you build quality into your product.

Windows compliance means that you are using the MS standard interface. This means you do not have to study yet another windowing protocol. Hypertext menus provide you with ready reference to the microcomputer specifications, architecture, and language as well as the environment. Views and reports on the source and assembly language are flexible and easy to use. No additional programming is required to simulate interrupts or I/O. A multipass disassembler permits the reconstruction and documentation of undocumented code.

Options

- *Performance analysis* provides you with a characterization of code, data, stack, and memory utilization by module and user-defined segment. This permits the identification of code for which improvements in memory or timing should be made. Flexible, graphical views and reports are easily defined.
- *Code Coverage analysis* provides you with a characterization of the test code and discovers inadequacies in the testing of the product. This enhances the quality of the product. Cyclomatic and other metrics are used to point out trouble spots.
- *Test Vector Extraction* provides a means of comparing the simulation test behavior with the actual behavior of the hardware. Synchronous behavior of the microcomputer is captured and can be used for validating the hardware/firmware design or as input to other test processes.

Contact MicroView for a brochure that discusses the advantages of these enhanced development tools over more conventional debug environments. Ask about the MicroView Quality Development Book.

Host System

- IBM PC AT, IBM PS/2
- Recommend 4 MB memory, 386/486 processor
- Compatible with most popular C compilers and assemblers

Target System

- 8051 Microcomputer core
- 8096 Microcomputer core
- Compatible with popular PROM programmer formats

MicroView

The Ultimate 80196 Family I.C.E.: The Trace 32 Development System

- ▶ The most advanced no-compromise system for logic development and analysis available
- ▶ Complete system control from a multiwindow, multitasking, real-time debugger for C, ADA, PL/M, Pascal, Modula-2, and ASM
- ▶ Control and debugger interfaces for PC-DOS, 386 UNIX, Sun 3, SPARC, HP 9000-300/400/700, VAX/VMS, and DECStation
- ▶ Support for 196KB, 196KC, 196KR, 196KS, 196KT, and 196MC derivatives
- ▶ Ethernet, SCSI, fiber-optic, serial, and parallel host/target interfaces available
- ▶ Expandable to 16 MB of emulation memory and 16 MB of breakpoint memory using static or dynamic RAM
- ▶ Multiprocessor development and debug using special synchronization logic
- ▶ Modular design facilitates simple low-cost conversion to different microprocessors

Contact

BSO/TASKING World Headquarters
333 Elm Street
Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

Call (800) 458-8276 for detailed product information.

**BOSTON
SYSTEMS
OFFICE
TASKING**

BSO/TASKING In-Circuit Emulation Systems and Logic Analyzers

• Trace 32 I.C.E. Systems

Trace 32 I.C.E. Systems by Lauterbach provide the ultimate technology available for leading-edge microprocessor development. Trace 32 is a universal development system with capabilities that are simply not found in other I.C.E. products. Trace 32 I.C.E. Systems provide in-circuit emulation, logic state and timing analysis, simulation, performance analysis, a universal device programmer, a universal counter/timer, a pattern/stimulus generator, a frequency/pulse generator, communications analysis, and more.

Each instrument is controlled directly from the host workstation or PC, through a sophisticated X or Microsoft Windows interface that includes a powerful multilanguage, multitarget debugger. This multitasking, real-time debugger supports C, ADA, PL/M, Pascal, Modula-2, and assembly language. In addition, all Trace 32 Systems support multiprocessor development and debugging through special synchronization logic, and every system provides four inter-trigger lines to trigger other instruments or accept external triggers.

Standard interfaces include RS-232, RS-422, and optionally high-speed fiber-optic or Ethernet interfaces.

You can configure these options to fit your special development needs. *Upgrade-ability to other micros and other options is the most cost-effective of any I.C.E. system on the market.* Trace 32 supports up to 16 MB of RAM and over 100 popular microprocessors and controllers.

If you require the highest-quality I.C.E. system available, call BSO/Tasking and ask for information on Trace 32.

• NetROM ROM Emulator

Designed around the network

NetROM emulates four 8-bit ROMs of 256 K or 1 MB of ROM to speed you through software development. No more burning and erasing, then plugging and unplugging EPROMs. ROM emulation saves time, effort, and materials, cutting back your development cost.

Now combine these features with a high-speed network interface and the ability to use standard Ethernet protocols to download and access your design from anywhere on the network, even remotely. Your target does not even need a comm port—simply ROM space that can be used by NetROM's virtual UART or serial port.

Over the network, you restart the target and begin your session. NetROM supports TCP, UDP, IP, ICMP, and SLIP protocols and includes Telnet, TFTP, BOOTP, RARP, SNMP, and PING applications.

CheckMate-C196K™ Emulator

- ▶ 16 MHz operation standard to support KC and KD targets
- ▶ 10MB-per-second communication speed
- ▶ Plug-in and run operation; fully supports Intel's ONCE™ mode.
- ▶ Does not use target ADDRESS or I/O space, Target Interrupts, or Stack space
- ▶ Windowed Source Level Debug interface standard
- ▶ Complete hardware event system has two ADDRESS comparators, one DATA Comparator, and instruction STATUS to trigger breakpoint or trace
- ▶ 1 K trace memory qualified by hardware event system
- ▶ 64 K overlay memory standard
- ▶ PC/AT or above hosted

Contact

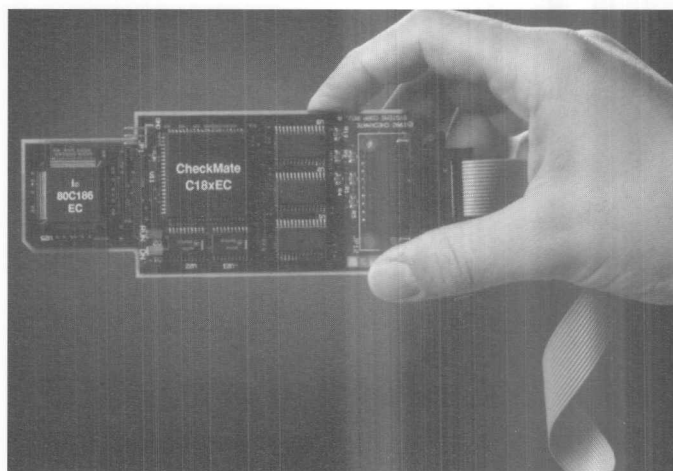
Mailing Address:
P.O. Box 3361
Redmond, WA 98073

Shipping Address:
15225 N.E. 90th Street
Redmond, WA 98052

North America, Asia, and Europe (other)
Checkmate Systems
Tel: 206-869-7211
Fax: 206-861-3647

Europe (Germany)
D=Systems GmbH
Tel: 49-813-125083
Fax: 49-813-114024

Europe (U.K.)
Great Western Instruments
Tel: 44-272-860400
Fax: 44-272-860401



Source-level Debug Environment

CheckMate-C196K™ comes complete with our own, windowed source-level debugger interface. Our entire emulator feature set is available directly in the debug environment. Of course, this means that CheckMate-C196K™ is compatible with all code generated from any languages that output OMF-96.

Rich Feature Set

Hardware Event System and Breakpoints

CheckMate-C196K™ provides features that only expensive emulators could in the past. A hardware event system gives you complete hardware breakpoint and trace ON/OFF control. The event system contains ADDR and ADDR RANGE comparators, a DATA comparator that can be masked to the individual bit, and a STATUS comparator. The comparators can be used in any breakpoint combination. Software, "ADDR only", breakpoints are also available. In addition, events can be defined using READ or WRITE on the internal RAM and SPR bus.

Trace Memory

The 1 K trace buffer captures all bus traffic with ADDR, DATA, and STATUS information. The CheckMate™ hardware event system can also qualify the contents of the trace memory to the individual instruction. A unique feature disables trace over a specified ADDRESS range so the operating system or kernel code is ignored.

Overlay RAM

Overlay memory comes standard with 64 K and it may be mapped to either internal ROM or external memory. This memory is Ø wait state at 16 MHz target clock operation.

Ordering Information

Contact factory for pricing. Available 2nd half 1993.

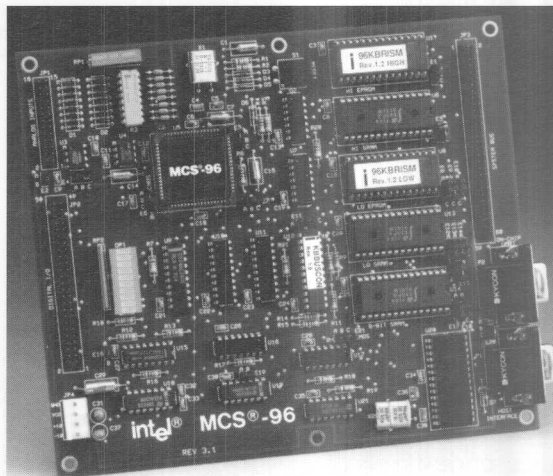
EV80C196KD EV80C196KC EV80C196KB EV8097BH EV80C196MC Evaluation Boards

- ▶ Zero-wait-state full-speed execution
 - 20 MHz for the EV80C196KD
 - 16 MHz for the EV80C196MC
 - 16 MHz for the EV80C196KC
 - 12 MHz for the EV80C196KB
 - 12 MHz for the EV8097BH
- ▶ 24 Kbytes of ROMsim
- ▶ Flexible wait-state, bus width, chip-select controller
- ▶ Totally CMOS, low-power board (EV8097BH features NMOS)
- ▶ Concurrent interrogation of memory and registers
- ▶ 16 software breakpoints
- ▶ 2 single-step modes
- ▶ High-level language support
- ▶ Symbolic debug
- ▶ RS-232C communication link

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

EV80C196KD, EV80C196KC, EV80C196KB, EV8097BH, EV80C196MC



Low-Cost Code-Evaluation Tool

The EV80C196KD, EV80C196KC, EV80C196KB, EV80C196MC, and EV8097BH evaluation boards provide a hardware environment for code execution and software debugging at a relatively low cost. Each board features an advanced microcontroller that is a member of the industry-standard MCS[®]-96 family. The boards allow the user to take full advantage of the power of the MCS[®]-96 architecture. Their memory (ROMsim) can be reconfigured to match your planned memory system, allowing for exact analysis of code execution speeds in a particular application.

Popular features such as a symbolic single-line assembler/disassembler, single-step program execution, and 16 software breakpoints are standard. Intel provides a complete code development environment using assembler (ASM-96) as well as high-level languages such as Intel iC-96 or PL/M-96 to accelerate development schedules.

Each evaluation board is hosted on an IBM PC or BIOS-compatible clone, already a standard development solution in most of today's engineering environments. The source code for the on-board monitor (written in ASM-96) is public domain. The program is about 1 K and can be easily modified to be included in your target hardware. In this way, the provided PC host software can be used throughout the development phase.

Personal Computer Requirements

The EV80C196KD, EV80C196KC, EV80C196KB, EV80C196MC, and EV8097BH evaluation boards are hosted on an IBM PC, XT, AT, or BIOS-compatible clone. The PC must meet the following minimum requirements:

- 512 Kbytes of memory
- A 360 Kbyte floppy-disk drive
- PC-DOS v3.1 or later
- A serial port (COM1 or COM2) at 9600 baud
- ASM-96, iC-96, or PL/M-96 language software
- A text editor such as AEDIT

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*[™] document #2589.



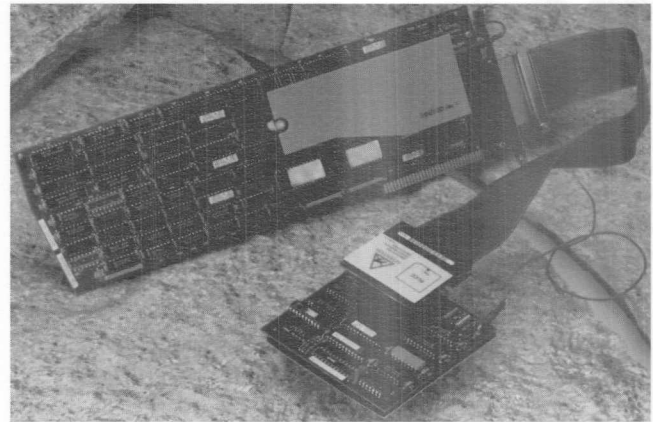
ICE™-196KD/PC

ICE™-196KD/PC In-Circuit Emulator for the MCS®-96 Microcontrollers

- ▶ Real-time, transparent, in-target emulation
- ▶ Zero-wait-state mapped memory
- ▶ Symbolic debug support
- ▶ Source-code display
- ▶ Execution breaks (3 specific or 1 range)
- ▶ Execution trace
- ▶ Stand-alone operation and self-test diagnostics
- ▶ Versatile and powerful host software

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

The ICE™-196KD/PC in-circuit emulator is a low-cost, PC card form-factor emulator that delivers real-time, high-level debugging capabilities to help you develop, integrate, and test your MCS®-96 microcontroller-based products. The emulator supports all component types as differentiated by ROM, EPROM, and ROMless as well as components differentiated by temperature, reliability screenings, package types, and speeds up to 16 MHz. Precise and reliable emulation is assured because of the emulator's ability to match the component's electrical and timing characteristics.

The ICE-196KD/PC emulator includes 64 KBytes of zero-wait-state, mappable ICE memory that can be enabled or mapped as read-only, write-only, or read-write. You can use this memory to simulate the internal (EP)ROM of the components or to simulate external program memory.

The emulator also includes a 2048-frame trace buffer for keeping a history of actual instruction execution. This buffer can be conditionally enabled or disabled to collect specific trace information.

Design team productivity is enhanced through the use of symbolic debug references to program line, high-level statements, and module variable names. Symbolic names used to develop programs are the same as those used for system debugging. You can browse through your original source code and, optionally, the high-level C or PL/M source code will be displayed when breakpoints are reached.

Host

DOS V3.3 or later

System Requirements

IBM PC, XT, AT, PS/2 Model 30, or 100% compatible machines

Memory Requirements

640 KBytes of RAM, hard disk

Other Requirements

Card plugs into single PC expansion slot, but allow two slots for clearance

Components Supported

8xC194, 8xC198, 8xC196KB, 8xC196KC, and 8xC196KD

Ordering Information for pICE196KDPC

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK™* document #2589.



ICE™-196KD/HX

ICE™-196 KD/HX

In-Circuit Emulator for the MCS®-96 Microcontrollers

- ▶ Real-time, transparent, in-circuit emulation
- ▶ On-circuit emulation (ONCE) for surface-mounted devices
- ▶ Execution and bus breaks
- ▶ Execution and bus trace
- ▶ Internal and external bus event recognition
- ▶ Zero-wait-state mappable ICE memory
- ▶ Source-level, symbolic debugging
- ▶ Full-color, windowed, easy-to-use interface
- ▶ Stand-alone operation and self-test diagnostics

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

The ICE™-196KD/HX in-circuit emulator is an easy-to-use, full-featured tool to help you develop, integrate, and test your MCS®-96 microcontroller-based products. The emulator supports all component types as differentiated by ROM, EPROM, and ROMless as well as components differentiated by temperature, reliability screenings, package types, and speed up to 20 MHz. Precise and reliable emulation is assured because of the emulator's ability to match the component's electrical and timing characteristics.

The ICE-196KD/HX is the tool for debugging the most complex CMOS MCS®-96 based designs. The emulator features a color, windowed human interface with pull-down menu, pop-up help, hypertext browsing, fill-in-the-blank forms, and function-key support to help simplify the debugging process.

Source-level debugging of object modules produced by high-level languages speeds the development process measurably. In the ICE-196KD/HX emulator, the debugging features, and the windowed interface work together to enhance and further speed debugging. Programs are loaded via emulator commands, breakpoints can be selected by point and set methods, and trace specifications can be set by using fill-in-the-blank forms.

The emulator allows you to access sophisticated event-recognition capabilities, including recognition of internal events. The events can then be used as triggers, including compound triggers. Break registers store trigger definitions for reuse. The fastbreaks feature allows you to execute emulator commands with minimal intrusion while the target is running. Similarly, the trace buffer is also accessible when the target system is running. Thus, it is not necessary to halt emulation to examine the emulation history.

The emulator also includes a 2048-frame trace buffer for keeping a history of actual instruction execution and bus activity, including addresses, op codes in hexadecimal and mnemonic formats, clips status, and read/write cycles.

Design team productivity is enhanced through the use of symbolic debug references to program line, high-level statements, and module variable names. Symbolic names used to develop programs are the same as those used for system debugging.

Host

DOS V3.3 or later

System Requirements

IBM PC, AT, PS/2, or 100% compatible machines

Memory Requirements

640 KBytes of RAM, hard disk

Other Requirements

RS-232 serial port

Components Supported

8xC194, 8xC198, 8xC196KB, 8xC196KC, and 8xC196KD

Ordering Information for pICE196KDHXDZ

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*™ document #2589.



MCS®-96 Accessories

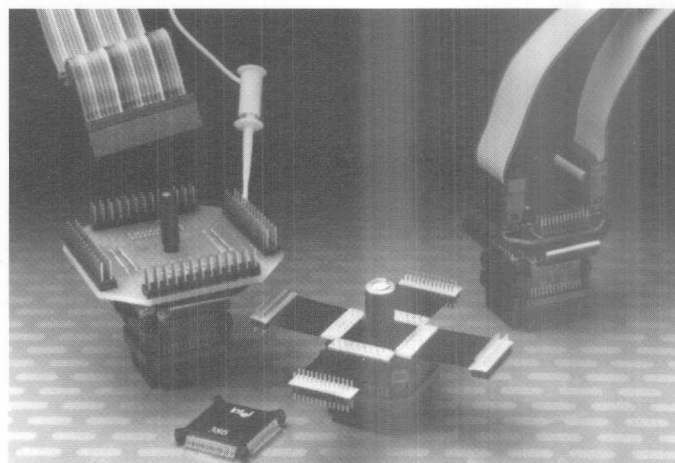
MCS®-96 Accessories

- ▶ Compatible with the full family of microcontrollers and support chips
- ▶ Full family of test clips for surface-mounted and thru-hole DIP, SOIC, SOJ, PLCC, PQFP, CQFP, MQFP, SSOP, TQFP, VQFP, TSOP, and TSSOP
- ▶ Locking action and two phases of contact alignment
- ▶ Different interfaces available for attachment to your instrument
- ▶ Custom sizes and configurations available by quotation
- ▶ Application support and technical assistance available

Contact

For technical information:
Bob Poirier at ITT Pomona
Tel: (909) 469-2912
Fax: (909) 629-3317

For pricing and availability or literature:
Contact Customer Service at (909)-469-2900

**Product Information**

These test clips are designed to aid emulation, production, or field testing and repair. Pomona offers a broad selection of clips in a wide assortment of configurations and sizes. From DIP clips to QFP clips for ceramic or plastic chips of greater than 200 pins, Pomona makes them all.

Pomona's patented locking clips connect to even the smallest support chip, such as a 20-pin QSOP package with a height of less than 1.4 mm. We also offer clips that handle four-sided SQFP chips with lead pitch of .5 mm and closer.

If you find your device is not included among our listed standards, contact us for a custom quotation. Many of these new configurations can be readily created with our in-house rapid-response capability.

To receive a Surface Mount and IC Test Accessories brochure or Pomona Catalog or to place an order, contact Customer Service.

ITT Pomona

TC2000

TC2000 16-bit Microcontroller Evaluation Board

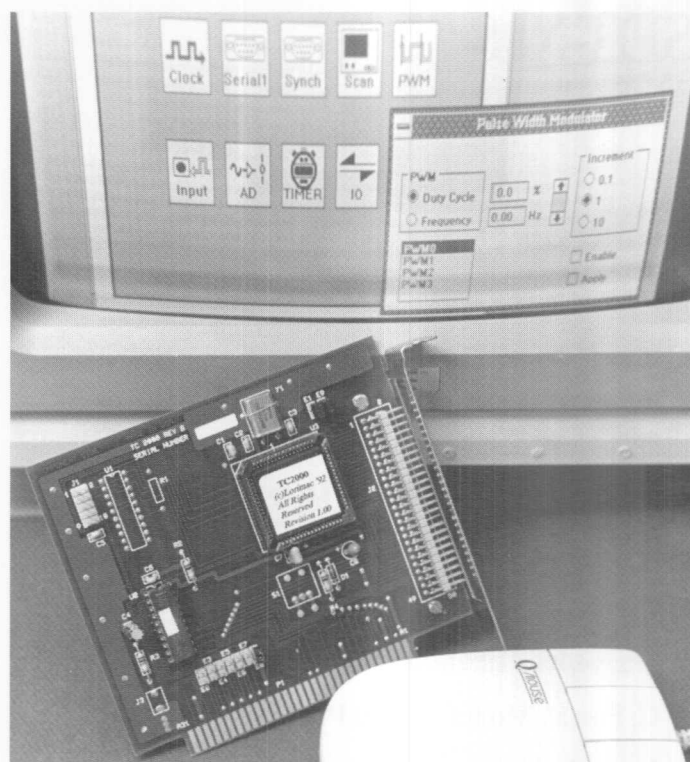
- ▶ PC-compatible plug-in card for evaluating 8XC196Kx peripherals
- ▶ Kit includes:
 - 8-bit PC (ISA) card
 - Click-on driver (Windows 3.1™ compatible)
 - A complete C-source library for easy integration into any C control program
 - Seven full-featured example programs
- ▶ Features include:
 - 13 general-purpose I/O pins
 - Four pulse width modulators (20 Hz to 40 KHz)
 - Eight analog-to-digital inputs (10-bits)
 - Five edge detect inputs
 - A serial port (full duplex with CTS/RTS)
 - A synchronous serial port (full duplex)

Contact

MJS Designs
1438 W. Broadway Road, #B185
Tempe, AZ 85282
Tel: (602) 966-8618

or

Lorimac Softwares
P.O. Box 717
Gilbert, AZ 85234
Tel: (602) 497-9421



Product Information

The TC2000 is an 8-bit ISA bus board used to evaluate most of the 8XC196Kx features using a standard C-compiler or Windows 3.1. It contains 38 pins of controller functions including 13 general-purpose I/O pins, 4 pulse width modulators (PWM) (from 20 Hz to 40 KHz), 8 analog-to-digital inputs (10-bit resolutions from 0 to 5 volts), 5 edge detect inputs (detect rising and/or falling edges and time stamp the edges), a full-duplex synchronous serial I/O port (up to 2 MHz bit rates), and a full-duplex asynchronous serial I/O port with CTS/RTS capabilities (30 to 1 Mbaud data rates).

Control these features with the easy-to-learn click-on driver that runs under Windows 3.1. For customized control and monitor functions, the TC2000 kit includes a complete set of ANSI-standard C-source code routines.

System Requirements

- 8086, 80286, 80386, 80486 PC and compatible systems (ISA bus only)
- Compatible with Hercules, MDA, CGA, EGA, and VGA monitors
- Click-on driver is compatible with Windows 3.1
- C-source libraries are compatible with any ANSI standard C compiler like Microsoft® Quick C, C/C++, and Borland® Turbo C and C/C++

Ordering Information

If you would like more information, call (602) 966-8618. To order, call (800) 445-9442.

- Part number: TC2000
- Suggested retail price: \$249.99

mjs
Lorimac Softwares

SDT-Xi

SDT-Xi Series
Emulators

- ▶ Transparent microprocessor in-circuit emulation for 80186/88 EA, EB, EC, and XL; 8086/88; and 80196 series
- ▶ 32 K x 88 bit time-stamped trace
- ▶ Examine trace without halting emulation
- ▶ Up to 2 MB of emulation memory
- ▶ High-speed fiber-optic interface
- ▶ C, Pascal, Modula-2, and PL/M support
- ▶ Up to 20 MHz no wait emulation
- ▶ Complex break/trigger system
- ▶ ONCE™ mode support

Contact

In the U.S.:
BSO/Tasking
333 Elm Street
Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

In Europe:
Noral Micrologics Ltd.
Logic House
Gate Street
Blackburn. BB1 3AQ
England
Tel: 44-254-682092
Fax: 44-254-680847
BBS: 44-254-679412

**Product Information**

Noral's SDT-Xi range of emulators support many different CPUs by utilizing low-cost configuration pods. Some pods offer multi-CPU support; for example, the P86i generic pod supports 8088, 80C88, 8086, 80C86 (Min & Max) 80188, 80C188, 80C188EA, 80C188EB, 80C188EC, 80C188XL, 80186, 80C186, 80C186EA, 80C186EB, 80C186EC to 20 MHz no wait where applicable. This is achieved by just replacing the header assembly containing the microprocessor to be emulated.

The SDT-Xi emulators include a fiber-optic communications interface for high-speed communications and fast download of code. Up to 72 KB of code per second is possible. This feature also gives the added bonus of optical isolation from your target.

The emulators support 32 K by 88 bit real-time trace and time-stamp buffer comprising 24 address bits, 16 data bits 32-bits of time-stamp information, 8 additional bits tracing CPU bus cycles, and user-configurable hardware probes together with a further 8-bits for the external probes.

Trace buffer input qualification allows precise control of the cycles to be traced and displayed on the fly with the target running completely in real-time.

The SDT-Xi emulators support the fully programmable target hardware event detect and sequencing system (EDS). The EDS can be programmed to monitor a wide range of target hardware characteristics including address and data bus activity, target CPU status signals, and eight external user-configurable target hardware signals. When used in complex applications, the EDS has the power to track down the most elusive of software and hardware bugs.

8620

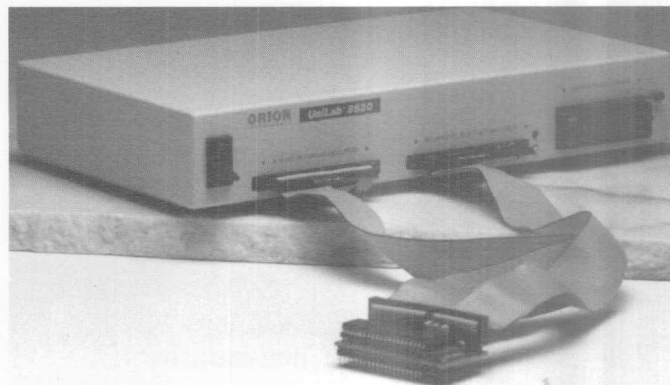
UniLab 8620 Analyzer-Emulator

- ▶ Full-speed, zero-wait-state support up to 16 MHz.
- ▶ 2.7K trace can be viewed without stopping or affecting the target; ideal for real-time embedded control system
- ▶ Support for applications with soldered-in MPUs
- ▶ 128K emulation memory option handles bank-switching
- ▶ High-level language/symbolic debug support
- ▶ Multiple breakpoint and single-stepping options
- ▶ Fast program download (64K in less than 3 seconds)
- ▶ Tremendous macro capabilities
- ▶ Built-in EPROM programmer
- ▶ Pop-up menu or command-driven

Contact

Orion Instruments, Inc.
180 Independence Drive
Menlo Park, CA 94025
Tel: (800) 729-7700 or (415) 327-8800
Ask for corporate sales
Fax: (415) 327-9881

ORION
INSTRUMENTS



Product Information

Orion's PC-based UniLab 8620 is a cost-effective, real-time development system that supports the MCS[®]-96 family. The 8620 never slows the processor with wait states, and its trace buffer can be viewed at any time, without having to stop at a breakpoint. This makes it particularly well-suited for real-time embedded control systems where the invasiveness of breakpoints disrupts system timing. A smart disassembler together with sophisticated triggering, filtering, and trace management make trace analysis fast and easy.

Symbolic debug and high-level language support are standard. The 8620 understands the symbolic debug output from Intel and other third-party assemblers and compilers. In addition, the 8620 supports both "step-into" as well as "step-over" single-stepping.

An extremely powerful macro capability lets you create custom commands and features. Macros can include DOS batch files, so you can automate the recompile, link, and load cycle for more productive program development.

In addition to the MCS[®]-96 family, the 8620 base unit supports more processors than any other development system. Processors supported include the 8051, 80C186, 68HC11, Z80/64180, 6502, and many more.

For intensive hardware debug and mixed-signal problems, Orion offers the OmniLab 9000 series, an integrated PC-based instrument featuring time-aligned displays of both digital and analog events, including disassembly. See the listing under Orion 9350 for more info.

Processors Supported

- 8096
- 8097
- 80C196KA
- 80C196KB
- 80C196KC
- 80C196KD
- 80C196KR/KQ

Host Systems Supported

PC compatibles
Complete UniLab 8620 systems for the MCS-96 start at \$4,595.

Available

Now!

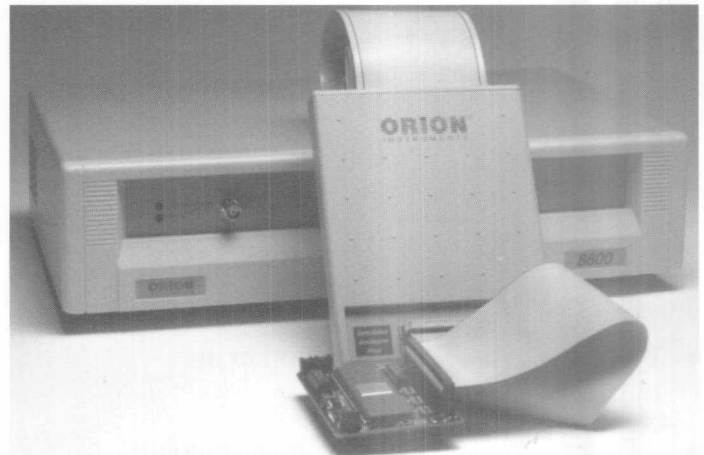
8800

8800 Emulator/Analyzer

- ▶ Full-speed, zero-wait-state, non-intrusive operation to 20 MHz and above
- ▶ Deep 64K real-time trace can be viewed at any time *without* halting the processor
- ▶ Sophisticated, multilevel triggering for precise trace capture and filtering
- Patent-pending Clip-On™ Emulation option for surface mount CPUs
- Up to 2 MB zero-wait-state emulation memory
- Ultra-fast parallel interface to PC downloads 128K file in under 2 seconds
- 65,535 hardware breakpoints, 256 software breakpoints
- High-level language/symbolic debug support
- Real-Time Performance analysis
- Tremendous macro capabilities

Contact

Orion Instruments, Inc.
180 Independence Drive
Menlo Park, CA 94025
Tel: (800) 729-7700 or (415) 327-8800
Ask for corporate sales
Fax: (415) 327-9881



Product Information

Orion's PC-based 8800 Emulator/Analyzer is a high-performance development system providing robust, zero-wait-state support for a wide range of MCS®-96 family members. With up to 2 Mbytes of zero-wait-state emulation memory, a deep trace, a fast parallel interface to the host PC, and a simplified yet powerful user interface, the 8800 offers an outstanding combination of features for development of MCS®-96 family hardware and software.

Because of its advanced logic analyzer-based design, the 8800 provides superior electrical and functional transparency. A unique Clip-On™ Emulation option enables you to clip on to the CPU in circuit, making the 8800 ideal for surface mount applications where the processor is soldered-in.

The 8800's exceptionally deep trace captures and displays trace data without having to stop at a breakpoint. The 8800's trace shows all processor bus cycles, including reads and writes, and a smart disassembler handles the 80C196's pre-fetch queue.

Symbolic debug and high-level language support are standard. The 8800 understands the symbolic debug output from Intel and other third-party assemblers and compilers.

An extremely powerful macro capability lets you create custom commands and functions. A "run-external" feature allows you to hot key out to your editor or compiler and then hot key back into the 8800 without disturbing emulation.

In addition to the MCS®-96 family, the 8800 base unit can support several other popular 8-, 16- and 32-bit microcontrollers.

For intensive hardware debug and mixed-signal problems, Orion offers the OmniLab 9000 series, an integrated PC-based instrument featuring time-aligned displays of both digital and analog events, including disassembly. See the listing under Orion 9350 for more info.

Processors Supported

80C196KB, 80C196KC, 80C196KD, 80C196KR/KQ, 80C196KT.
Call for availability on other MCS®-96 family members.

Host Systems Supported

386 or higher PC compatibles

ORION
INSTRUMENTS

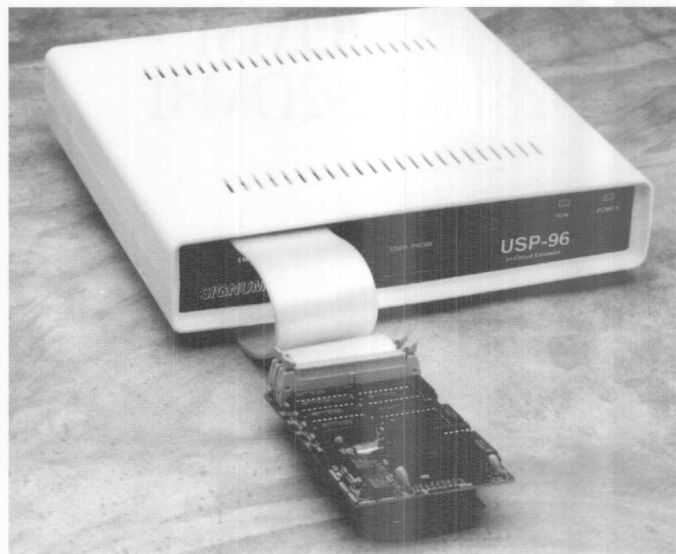
USP-96

USP-96 In-Circuit Emulator

- ▶ Real-time emulation up to 20 MHz
- ▶ Real-time access to program memory, trace, and breakpoints
- ▶ HLL debugging in C and PL/M
- ▶ 32K by 80-bit trace buffer
- ▶ Up to 256 K of emulation memory
- ▶ Foreground and background monitor
- ▶ Complex hardware breakpoints
- ▶ INST split memory support
- ▶ The best user interface in the industry

Contact

SIGNUM SYSTEMS
171 E. Thousand Oaks Blvd., #202
Thousand Oaks, CA 91360
Tel: (415) 903-2220 or (805) 371-4608
Fax: (415) 903-2221 or (805) 371-4610
Email: Attmail!Signum



Product Information

The Signum Systems USP-96 gives you true real-time in-circuit development and debugging at any level, machine code to C and PL/M. You can watch variables change on-the-fly, and zoom in on a member of a local complex structure with just a click of a mouse. Signum Systems has engineered emulators to the highest standards since 1979, and it is our policy to provide free customer support along with free software/firmware updates. That means Signum has an economic imperative to deliver precise and dependable instruments and the experience to make it possible.

Like all Signum emulators, there is no confusing list of options to configure. The USP-96 comes complete with high-level debugging that works with your favorite compiler, an 80-bit wide by 32 K deep trace, and debugging features that cost extra on most other emulators. A special foreground monitor allows all user's interrupts to work in real time during breakpoints and while single stepping.

Extensive use of dual-ported RAM means you have access to all emulation memory, captured trace, and trace triggering without intruding on your design. And our windowed interface makes it easy to use. You can use the command line interface, or just point and click. Sampling trace allows you to capture only meaningful data. Complex breakpoints with an eight-level sequencer, two 16-bit pass counters, a foreground monitor, and an external trigger make this tool indispensable in any MCS[®]-96 embedded application.

Call for detailed specifications and a demo disk.

Ordering Information

- All units include 64 K memory, 32 K by 80-bit trace, HLL debugger for C and PL/M, and free technical support.
 - USP-96 for up to 16 MHz
 - USP-96/20 for up to 20 MHz
- 7 PODs for 8098, 8095/96/97BH, 80C196KB, KC, KD, and KR are available now.
- Call our sales office for a complete list of devices.

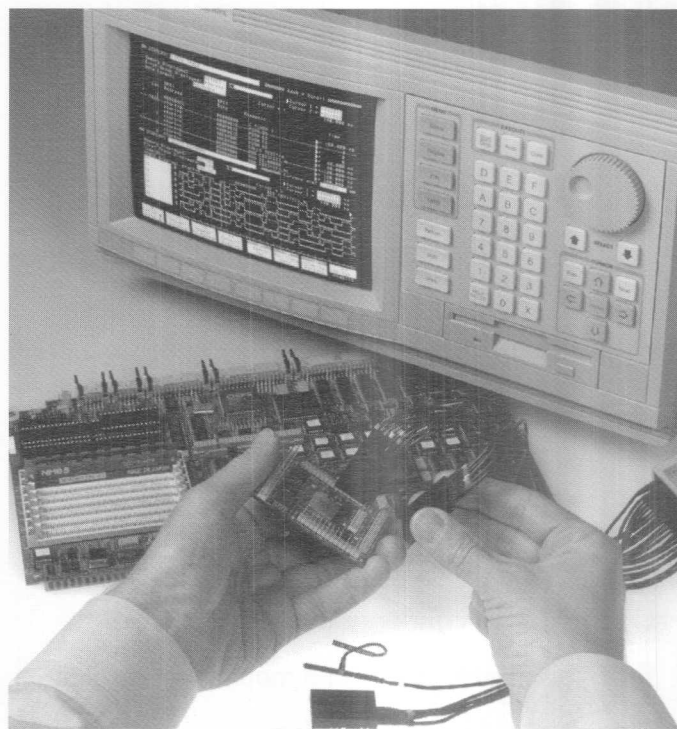
SIGNUM SYSTEMS

32GPX and 32DM81 DAS9281 and 92DM81

- ▶ Real-time symbolic debug of MCS[®]96 architecture systems
- ▶ Trace identifies instructions actually executed and branches taken
- ▶ Single connection probe adapters for most MCS[®]96 architecture devices
- ▶ 80- to 100-MHz state acquisition
- ▶ Timing analysis on all channels through same probe adapter
- ▶ ROM emulation
- ▶ Real-time performance analysis
- ▶ Links to high-level languages
- ▶ Prices start at \$9,000

Contact

Tektronix, Inc.
National Marketing Center
P.O. Box 4600 M/S 94-860
Beaverton, OR 97076
Tel: (800) 426-2200



Product Information

The GPX Logic Analyzer is a general-purpose instrument with features for everyone on the design team. Complete systems for microprocessor analysis start at \$9,000. The GPX series comes in a 3001GXP monolithic unit or a 3002 modular mainframe. Both units offer a 64-MB hard disk and an MS-DOS compatible floppy for data storage, keyboard, and a variety of monochrome and color displays. The GPX offers 80 to 160 channels of 80-MHz state acquisition; 200-MHz transitional timing analysis on all channels; 16 to 32 channels of 1-GHz timing acquisition (40 K deep); true simultaneous state and timing analysis without double probing; ROM emulation; real-time performance analysis; and links to high-level languages such as C, C++, Pascal, and Ada.

The DAS9200 Digital Analysis System is a modular instrumentation platform that you can operate locally using a color X-terminal or from a workstation via a standard X11/R4 server. Host communication is supported via LAN, RS-232, or GPIB. CENTURION is a family of highly integrated DAS9200 acquisition modules designed specifically to address the demanding requirements of the fast, wide, complex buses of today's microprocessors. The 96 channels of 100-MHz synchronous acquisition on each module lets you use multiple modules to support multiple microprocessors with no compromises in speed or timing. Memory depths from 8-K samples to 512-K samples lets you capture both the symptom and cause of complex problems. The DAS9200 offers software performance analysis at full speed with up to 5,000 symbolic ranges.

Tektronix



80C186 Architecture

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C X86 Tools

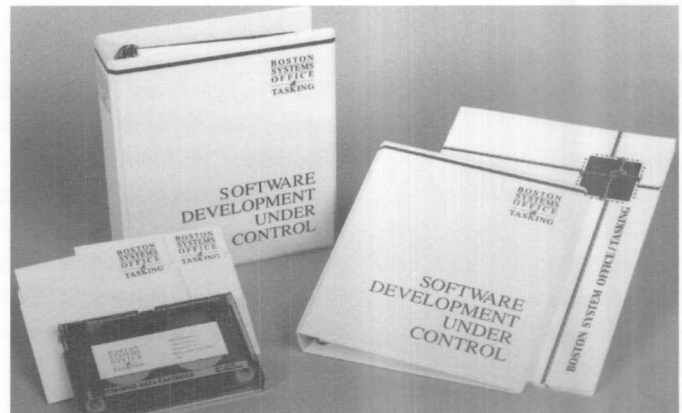
The Complete 80X86 Family Software Application Development Toolkit

- ▶ Highly optimized ANSI C compiler for the 80X86 family
- ▶ Complete hardware and software floating-point support
- ▶ Support for five memory models
- ▶ Interrupt handlers can be written in C for optimum performance
- ▶ Run-time libraries provided in source
- ▶ Intel compatible macro assembler
- ▶ Sophisticated incremental linker, locator for complete control
- ▶ Multiwindow, high-level language target ROM or I.C.E. debugger
- ▶ Available on PC-DOS, Sun SPARC, DEC VAX, DECStation, IBM RS6000, HP 9000, and NEC PC

Contact

BSO/TASKING World Headquarters
333 Elm Street
Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

Call (800) 458-8276 for detailed product information.



Product Information

The BSO/TASKING development solution for the Intel 80186 family consists of an ANSI C compiler, assembler, linker, locator, and powerful high-level language debugger. These products provide an integrated environment for developing highly optimized ROMable code for the 8086 family.

The C compiler is ANSI C compatible and also conforms to K&R. The compiler has a number of extensions that are essential for developing a reliable embedded application:

- Interrupt handlers can be written in C
- Direct control of I/O using predefined functions
- Control of global data placement
- Control of datatype size
- Floating-point options:
 - In-line 8087/287 floating-point routines or
 - Software floating-point libraries (IEEE, double precision)
- Complete run-time libraries
- Five memory models supported
- Full debugging information

The macro assembler is compatible with Intel's assembly language. The assembler features macro coding, conditional assembly, structured code statements, optimized address modes, and unlimited symbols.

The linker is an essential part of the toolset and enables you to link and locate modules anywhere in the target memory and do partial linking. The locator is ultimately flexible and enables you to use the total range of memory available in the target.

CrossView, BSO/TASKING's debugger, is an easy-to-use multi-window, source-level debugger that enables you to test and debug code while it is executing in the target environment. CrossView supports both emulator and ROM monitor target environments. Debugging features are powerful and easy to use. You can single step, set breakpoints, and monitor the values of variables and expressions.

**BOSTON
SYSTEMS
OFFICE
TASKING**

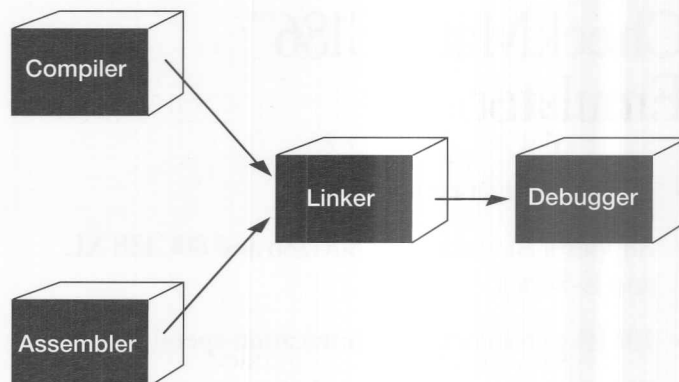
Organon

Organon Cross-Software Development Environment

- ▶ Supports all Intel 80x86 CPU's
- ▶ Provides Intel compatible options
- ▶ Supports OMF86/OMF386 object format
- ▶ Able to read Microsoft C
- ▶ Runs on PC- and MS-DOS, PC UNIX, Sun OS, VAX/VMS, VAX/ULTRIX, DEC/ULTRIX, and HP APOLLO
- ▶ Includes powerful cross debugger
- ▶ C++ support
- ▶ Offers X-Window and ASCII versions

Contact

Andreas Sczepansky
CAD-UL GMBH
Einsteinstr. 37
7900 Ulm, Germany
Tel: (49)-731/937600
Fax: (49)-731/9376027



Product Information

CAD-UL offers professional, high-quality cross and native software development tools for Intel target processors. Our customers make great advances in productivity with the software tools of CAD-UL.

The ORGANON C-Cross Optimizing Compiler is one of CAD-UL's software tools. The ORGANON C-Cross Optimizing Compiler has been developed by CAD-UL for professional use and for a wide variety of applications. For example, some of the Intel options it supports include:

- #pragma fixedparams, varparams
- #pragma align, noalign.

The innovative C compiler enables switchable optimizing routines and user-defined intrinsic functions to support real-time kernels like pSOS+ and more.

ORGANON XDB is CAD-UL's high-level language debugger for cross and native software debugging. The ORGANON XDB makes the controlled execution of the debugged program possible. The execution can be controlled by breakpoints and watchpoints. It enables you to pass the program in several steps. You can track the program in both languages: in the high-level language (C, Pascal, Fortran, and PL/M) and in assembler. It supports two user interfaces: the X-Window version and ASCII version.

The XDB is available as ROM monitor version, but it also supports some emulators (HP, AMC, and MICE).

Along with our own products, we offer software tools for Ada development. Hence, we are able to supply all tools necessary for professional software engineering.



CheckMate-C186™

CheckMate-C186™
Emulator

- ▶ 20 MHz operation standard
- ▶ Supports all versions of 80C186 and 80C188 XL and E-Series
- ▶ 10MB-per-second communication speed
- ▶ Plug-in and run operation; fully supports Intel's ONCE™ mode
- ▶ Does not use target ADDRESS or I/O space, Target Interrupts, or Stack space
- ▶ Paradigm DEBUG™ Source Level Debug interface standard
- ▶ Complete hardware event system has two ADDRESS comparators, one DATA Comparator, and instruction STATUS to trigger breakpoint or trace
- ▶ 1 K trace memory qualified by hardware event system
- ▶ 256 K overlay memory standard (optional 512 K and 1 MByte)
- ▶ PC/AT or above hosted

Contact

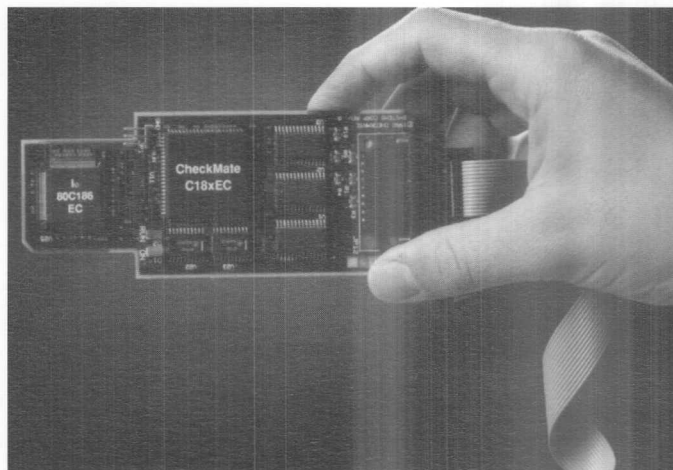
Mailing Address:
P.O. Box 3361
Redmond, WA 98073

Shipping Address:
15225 N.E. 90th Street
Redmond, WA 98052

North America, Asia, and Europe (other)
Checkmate Systems
Tel: 206-869-7211
Fax: 206-861-3647

Europe (Germany)
D=Systems GmbH
Tel: 49-813-125083
Fax: 49-813-114024

Europe (U.K.)
Great Western Instruments
Tel: 44-272-860400
Fax: 44-272-860401

**CheckMate Systems™****Source-level Debug Environment**

CheckMate-C186™ comes complete with Paradigm DEBUG, the industry-standard, source-level debugger interface you demand. Our entire emulator feature set is available directly in the debug environment. Of course, this means that CheckMate-C186™ is compatible with all code generated from any languages supported by the debugger products. In addition, CheckMate-C186™ provides several special capabilities like single screen display, and full edit and save of the Peripheral Control Block register data.

Rich Feature Set**Hardware Event System and Breakpoints**

CheckMate-C186™ provides features that only expensive emulators could in the past. A hardware event system gives you complete hardware breakpoint and trace ON/OFF control. The event system contains ADDR and ADDR RANGE comparators, along with a DATA Comparator that can be masked to the individual bit, and a STATUS comparator. The comparators can be used in any breakpoint combination. In addition, software, "ADDR only", breakpoints are available.

Trace Memory

The CheckMate-C186™ hardware event system can also qualify the contents of the trace memory. The 1 K trace buffer captures all bus traffic with ADDR, DATA, as well as STATUS information, and can be qualified to the individual instruction. A unique feature disables trace over a specified ADDRESS range so the operating system or kernel code is ignored.

Overlay RAM

Overlay memory comes standard with 256 K and it may be mapped into four noncontiguous target address spaces. This memory is Ø wait state at 20 MHz target clock operation.

Ordering Information

Contact factory for pricing.

Soft-Scope III

Soft-Scope III for CSiMON

Remote Target Debugger

- ▶ Supports the Microsoft Windows or our own full-featured windowed interface
- ▶ Provides full source code and a special utility that makes the CSiMON monitor easy to configure for custom hardware
- ▶ Lets you embed a configured monitor in your products royalty-free*
- ▶ Includes preconfigured monitors for PC targets so you can debug on a second PC before hardware is available
- ▶ Stops the target with no breakpoints set
- ▶ Provides access to memory while the target is running
- ▶ Provides access to 80186 internal structures
- ▶ Lets you configure the monitor as a library to link with your application
- ▶ Supports a broad range of compilers/linkers
- ▶ Provides run-time error checking
- ▶ Supports application I/O

Contact

Concurrent Sciences, Inc.
P.O. Box 9666
530 S. Asbury
Moscow, ID 83843
Tel: (208) 882-0445
Fax: (208) 882-9774

The screenshot displays the Soft-Scope III debugger interface. At the top, there are menu bars: File, Code, Data, Break, Macro, Window, Options, and Help. Below the menus, the '3-Reg' window shows register values: eax=0, ebx=0, ecx=0, edx=f, and efi=0. The 'Code' window displays assembly instructions and their addresses. The 'Stack' window shows a stack trace for the function 'CUTILS.delay_line()'. The 'Watch' window lists variables like LIGHTS[1] through LIGHTS[6] with their addresses and values. The main window shows the source code for 'CUTILS.delay_line()' with line numbers 115 through 128.

Product Information

Designed by the company that introduced the first source-level debugger for the 8086, the Soft-Scope III remote-target debugger with the CSiMON monitor supports software development of embedded and/or real-time systems based on any processor in the 80x86 family, from the 8086 to the 80486.

Soft-Scope III provides access to all 80186 features including the Peripheral Control Block (PCB). You can access the standard 186 PCB as well as those on the EA, EB, EC, and XL.

The CSiMON monitor is bundled with the debugger and includes complete source code and an easy-to-use configuration utility to allow custom configurations. The source code is written almost entirely in C and has a ROM image of less than 16 K.

You can build the monitor to be polling or interrupt driven, absolutely ROMmed, or as a library to link with your own application.

When the monitor is complete, you can leave it on your board and ship it as part of your product. Since the monitor is royalty-free, no cost is added to your product and the monitor is always available for field support!

If you have a Tektronix logic analyzer (models DAS 9200 or Prism 3000), the addition of Concurrent Sciences' CSi-LINK symbolic converter allows you to correlate the logic analyzer's sophisticated hardware trace to Soft-Scope III's source-code display. You can set complex breakpoints on the logic analyzer that cause Soft-Scope III to break when one of the conditions occurs.

* The CSiMON monitor can be incorporated in your company's products, royalty-free, provided a signed "Incorporation License Agreement" is on file at Concurrent Sciences, Inc. (no additional cost).

iC-86

iC-86 C Compiler for 86/88 and 186/188

- ▶ Generates compact efficient code
- ▶ Highly optimized with four levels of optimization
- ▶ Produces ROMable code
- ▶ Supports small, compact, medium, and large segmentation models
- ▶ Extensive debug information
- ▶ Built-in functions to improve compile-time performance
- ▶ Built-in functions to improve run-time performance
- ▶ ANSI C conforming

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Product Information

The iC-86 compiler brings the power of the C programming language to 8086/80C186 and 8088/80C188 embedded designs. In addition to outstanding execution speed, the compiler generates compact efficient code that can be loaded directly into ROM-based systems. The compiler supports four levels of optimization, including a jump optimizer and improved register manipulation via register history. It also supports four memory segmentation models—small, compact, medium and large—to meet your specific needs, allowing memory modules to be mixed using “near” and “far” pointers.

Built-in access to low-level hardware features minimizes the need for in-line assembly code or for making calls to assembly functions and allows registers, I/O ports, interrupts and numerics chips to be controlled directly in C.

The iC-86 compiler generates symbolic debug information to support in-circuit emulators and debuggers. You can also use the iC-86 to develop real-mode programs to be executed on the 80C286 or the Intel386™ microprocessors. An assembler package may be required when customizing startup code or developing optimized assembly-language procedures using an Intel high-level language.

Host

DOS V3.3 or later

Ordering Information FOR D86C86NL

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK™* document #2589.

ASM-86

ASM-86 Assembler for 86/88 and 186/188

- ▶ Macro facility saves development and maintenance time
- ▶ Simplified instruction set for easy program development
- ▶ Extensive checks on consistent use of variables and labels
- ▶ Incremental linking allows easy addition of modules
- ▶ Simplifies setup for ROM-based systems

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

ASM-86 is the macro assembler for the 8086/8088 and 80186/80188 microprocessor families. It offers many features typically associated with high-level languages. The macro facility eliminates repetitive coding of common program sequences. It performs extensive checks on the use of the variables and labels, thus detecting errors early in the coding process.

Utilities

The ASM-86 assembler package includes the following utilities:

- Linker/Binder, for combining multiple object modules into a single program and resolving references between independently compiled modules. This tool can increase productivity by enabling you to use modular programming, making applications easier to design, test, and maintain.
- Locator/Builder, for producing absolute object modules and assigning addresses. Optional print file contains diagnostic information helpful in debugging.
- Librarian, for creating and maintaining libraries of object modules. Standard modules can be placed in a library and linked to your application via the Linker/Binder.
- Object-to-hex converter, for converting object modules into standard hexadecimal format, allowing code to be loaded directly into PROM using industry-standard PROM programmers.

Host

DOS V3.3 or later

Ordering Information for D86ASM86KIT

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*™ document #2589.

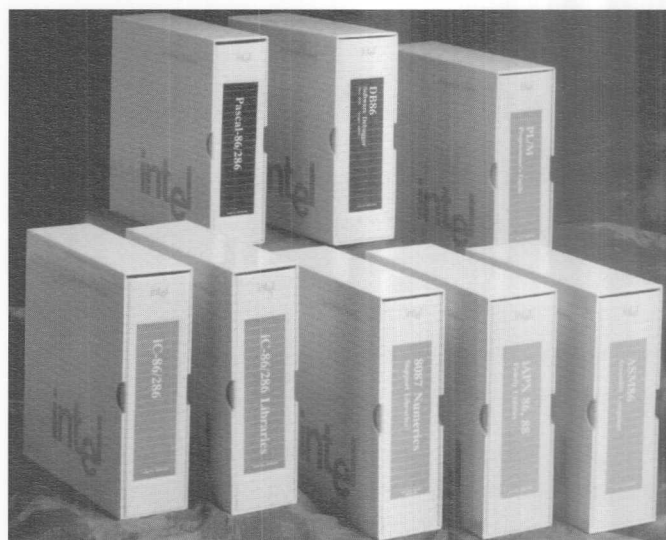
PL/M-86

PL/M-86 PL/M Compiler for 86/88 and 186/188

- ▶ Modular and structured programming support
- ▶ Extensive built-in functions provided
- ▶ Interrupt handling procedure definitions
- ▶ Highly optimized with four levels of optimization
- ▶ Compile-time options to increase flexibility
- ▶ Seven data types supported
- ▶ Object modules compatible with other languages

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

**Product Information**

The PL/M-86 compiler is a high-level language that is designed to program Intel's advanced 16-bit microprocessors. The PL/M compiler provides the productivity advantages of a high-level language while offering the low-level access to hardware usually available only through assembly language. With modular and structured programming supported, final applications are easier to understand, maintain, and support. The extensive list of built-in functions includes type conversion, string manipulations, and functions for interrogating hardware flags. Using the INTERRUPT attribute, the compiler generates code to save and restore all registers for interrupt procedures. Along with the four optimization levels, additional compile-time options include conditional compilation, inclusion of common PL/M source files from disk, symbol cross-referencing, and optional assembly-language code in list file. An assembler package may be required when customizing startup code or developing optimized assembly-language procedures when programming with an Intel high-level language.

Host

DOS V3.3 or later

Ordering Information for D86PLM86NL

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*™ document #2589.

Fusion TCP/IP

Fusion TCP/IP
Developer's ProgramTCP/IP Protocol Software for
Networked System Developers

- ▶ Complete TCP/IP protocols: TCP, UDP, IP, ARP, RARP, ICMP, SNMP, SMTP, Domain Name System, and SLIP/PPP
- ▶ Complete TCP/IP applications: Telnet, FTP, TFTP, and R-Commands; both client and server included
- ▶ Berkeley sockets library and socket manager
- ▶ Intel 286/386/486 processor interface
- ▶ Wide variety of network drivers and interfaces including intelligent protocol processors

Contact

In the United States:

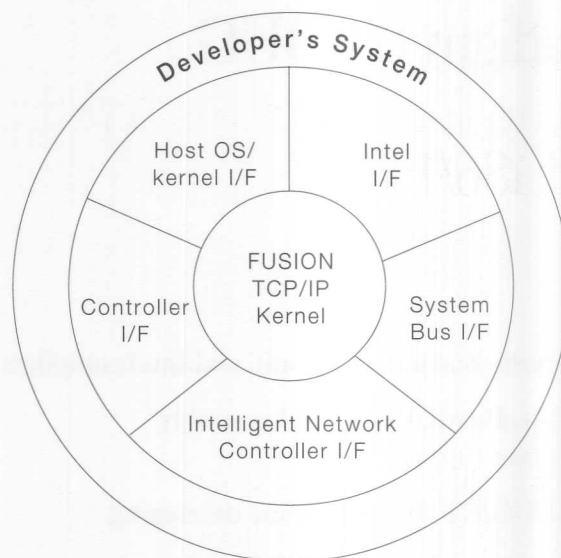
Pacific Softworks (Corporate Headquarters)
4000 Via Pescador
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Tel: (805) 484-2128
Fax: (805) 484-3929

Southwest Region
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Attn: Jim Giles

Northwest Region
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Fax: (408) 249-3767
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Fax: 44-489-885923
Attn: John Kinneavy

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Japanese Subsidiary
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Tokyo 102, Japan
Tel: +3-5276-2668
Fax: +3-5276-2669
Attn: Mr. Yokoyama

**Product Information**

The FUSION Developer's Program is designed to help you add the industry-standard TCP/IP protocol suite to your Intel processor-based products. Using FUSION Developer's Kit and the support and training package from PSI, you are up and running on TCP/IP in the shortest amount of time possible. FUSION TCP/IP protocols have been used by over 150 major OEMs and system integrators since 1985.

FUSION is a multitasking kernel based on a Berkeley sockets interface. All TCP/IP protocols and applications—including Network File System (NFS) based on Sun specifications—were designed by PSI engineers. PSI eliminated operating system dependencies in the FUSION code, so that it is portable to many different operating systems, including real-time systems.

FUSION Developer's Training provides three days of intensive hands-on training in the internal architecture of the FUSION code. Up to 90 days of engineering telephone porting support is included in the training package.

Options

Network File System (NFS) client and server based on Sun specifications.

Technical/Custom Support Available

- Regularly scheduled FUSION Developer's Training Classes
- Porting support for up to 90 days as part of initial training/support package
- Porting consultation available (beyond standard training and support package)
- Porting service (by contract)
- Annual source maintenance and support plans



Pacific Softworks

Paradigm DEBUG

Paradigm DEBUG

- ▶ Supports Borland, Microsoft, and Intel compilers
- ▶ C/C++, Pascal, PL/M, and assembly language support
- ▶ DEBUG/RT for stand-alone debugging
 - Serial, parallel, or custom interfaces
- ▶ DEBUG/ICE for popular in-circuit emulators
 - Hardware breakpoints
 - Real-time trace
 - Emulation memory mapping
 - Save/restore emulator setups
- ▶ Unlimited free technical support

Ordering Information

- | | |
|---------------------------|---------------------------------------|
| • TDREM | \$195 |
| • Paradigm DEBUG/RT-186Ex | \$395 |
| • Paradigm DEBUG/ICE | Contact Paradigm for sales assistance |

Contact

For complete specifications, data sheets, and a demo diskette, contact:

Paradigm Systems
3301 Country Club Road, Suite 2214

Endwell, NY 13760

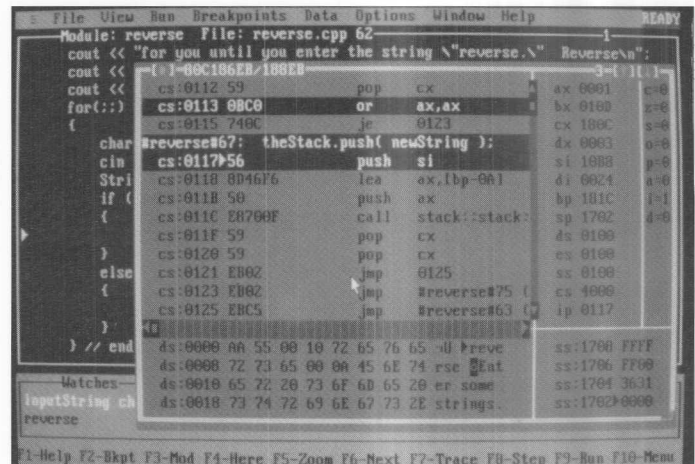
Sales: (800) 537-5043

Technical support: (800) 582-0864

International sales/support: (607) 748-5966

Fax: (607) 748-5968

BBS: (607) 786-0705



Product Information

Paradigm DEBUG is a family of C/C++ source-level debuggers based on the award-winning Turbo Debugger from Borland. Paradigm DEBUG is unique in providing a high-level user interface for debugging embedded applications developed with Borland C++, Microsoft C/C++, or the Intel development tools.

Using the TDREM target-system debugging kernel, Paradigm DEBUG/RT provides unparalleled visibility into the inner workings of your application—as it executes on your target system. You can download your application, set breakpoints, and view memory or peripherals all with unsurpassed ease. Best of all, our full-featured embedded-system debugging solution using DEBUG/RT and TDREM doesn't break your development-tool budget.

All too often, real-time embedded systems require a nonintrusive solution and an in-circuit emulator. Paradigm DEBUG/ICE is a true superset of the Paradigm DEBUG/RT debugger, offering extensions for hardware breakpoints, real-time trace, emulator memory, and much more. And Paradigm DEBUG is unique in its support for a broad range of in-circuit emulators.

As the acknowledged leader in C/C++ embedded-system development, Paradigm has the knowledge and experience to provide comprehensive support for all aspects of 80C186Ex embedded-system design. Our technical expertise is readily available to all Paradigm customers, and even the phone call is free.

Whatever your requirements, Paradigm has a comprehensive solution to your software and hardware development needs. Try out any Paradigm DEBUG product at no risk and see if you don't agree that Paradigm is your ticket to faster 80C186Ex embedded-system software development.

Supported Emulators

- Intel
- Applied Microsystems
- CheckMate Systems
- ZAX
- Others (Contact Paradigm for the latest list of supported in-circuit emulators.)

PARADIGM

Paradigm LOCATE

Paradigm LOCATE

- ▶ Fast, full-featured embedded-system utility
- ▶ Supports all Microsoft C/C++ compilers
- ▶ Unmatched Borland C++ support
- ▶ Complete ROMable startup code supplied
- ▶ Comprehensive run-time library support included
- ▶ Supports popular in-circuit emulators
- ▶ Free technical support with toll-free technical support phone lines
- ▶ 24-hour bulletin board available
- ▶ 30-day satisfaction guarantee

Contact

For complete specifications, data sheets, and a demo diskette, contact:

Paradigm Systems

3301 Country Club Road, Suite 2214

Endwell, NY 13760

Sales: (800) 537-5043

Technical support: (800) 582-0864

International sales/support: (607) 748-5966

Fax: (607) 748-5968

BBS: (607) 786-0705



Product Information

Paradigm LOCATE is the premier software development package for all Intel 80C186Ex embedded applications. Supporting the latest releases of the Borland C++ and Microsoft C/C++ compilers, Paradigm LOCATE provides comprehensive ROMable startup code plus full run-time support for floating-point, stream I/O, and dynamic memory management, complete with ready-to-run sample applications.

Paradigm LOCATE software offers you unsurpassed capabilities for debugging embedded applications. It fully supports Borland/Microsoft C, C++, and assembly language applications with the award-winning Paradigm DEBUG source-level debugger. If you need access to Intel OMF86 output files, you will also find Paradigm LOCATE unequalled in its support of Borland and Microsoft compilers with popular in-circuit emulators. And when it's time to burn a set of EPROMs, Paradigm LOCATE supports popular EPROM hex and binary formats, including splits and checksums.

Paradigm technical support for your embedded 80C186Ex application is unequalled. As a Paradigm customer, you have immediate access to our knowledgeable technical staff using toll-free support hot lines and a 24-hour bulletin board. And unlike other vendors that force you to pay up-front for technical support, we stand behind our tools with unlimited free technical support.

The choice for 80C186Ex development tools is clear. Paradigm LOCATE and Paradigm DEBUG were selected by Intel to ship with the popular ICE-186 in-circuit emulator and with the 80C186Ex evaluation board design kits. So whatever your choice of software development tools, Paradigm LOCATE is the fastest, most comprehensive path to success in 80C186Ex embedded-system software development.

Supported Processors

- Intel 80C186EA/XL
- Intel 80C186EB
- Intel 80C186EC
- All 80x86-compatible MPUs

Ordering Information

Paradigm LOCATE \$395

PARADIGM

386|ASM/LinkLoc

386|ASM/LinkLoc

- ▶ Includes one-step linker/locator for real- and protected-mode programs
- ▶ Includes 386|ASM, a 16/32-bit macro assembler for 80x86 processors
- ▶ Includes 386|DOS-Extender for prototyping 32-bit protected mode software on 386/486 PCs
- ▶ Supports most popular real-time executives
- ▶ Supports full line of Intel 80x86 family processors and coprocessors
- ▶ Works with a wide variety of industry-leading 80x86 compilers
- ▶ Supports output formats for all types of emulators, PROM programmers, and debuggers
- ▶ Accepts input in most popular MS-DOS object module formats
- ▶ Accepts source code symbolic information in Intel formats and Microsoft CodeView formats
- ▶ Works on a wide variety of hosts including PCs, workstations, and minicomputers

Contact

Phar Lap Software, Inc.
60 Aberdeen Avenue
Cambridge, MA 02138
Tel: (617) 661-1510
Fax: (617) 876-2972



Product Information

386|ASM/LinkLoc is Phar Lap's complete 80x86 embedded development package. It has all the components needed to build embedded systems: 386|ASM, Phar Lap's full-featured, 16/32-bit macro assembler; LinkLoc, a one-step linker/locator used for linking and locating real- and protected-mode programs for downloading to in-circuit emulators, software debuggers, and PROM programmers; and 386|DOS-Extender, a protected-mode run-time environment for prototyping on a 386 or 486 PC.

With LinkLoc's rich set of command switches, you have complete control over the link/locate process. You can get full symbolic debugging support with your favorite compiler on the host of your choice. LinkLoc supports popular 16-bit compilers and assemblers, including Microsoft C and Microsoft MASM, as well as industry-standard 32-bit compilers including MetaWare, Intel, Green Hills, and Alsys. It can be used with most popular real-time executives such as VRTX, C Executive, Regulus, AMX, TSX, MTOS/386, and iRMK.

LinkLoc offers embedded developers unmatched compatibility. It accepts input in most popular MS-DOS object module formats and supports output formats for all types of emulators, PROM programmers, and debuggers, including full source code symbolic information appropriate to each format. Input formats include Intel OMF-86, OMF-286, OMF-386, and Phar Lap Easy OMF-386. Output formats include Intel OMF-86, Bootloadable OMF-286, Bootloadable OMF-386, Intel hexadecimal, Motorola S-Record, MS-DOS .EXE, and Phar Lap .EXP

Processors Supported

- Intel 8086/8088
- 80186/188
- 80286
- 80386
- 386SX
- i486

Coprocessors Supported

- Intel 8087
- 287
- 387

Ordering Information

- 386|ASM/LinkLoc is available from Phar Lap for \$1,295.
- LinkLoc is also available separately for \$795.
- To order, contact the Phar Lap Sales Department at (617) 661-1510 or Fax your order to (617) 876-2972.

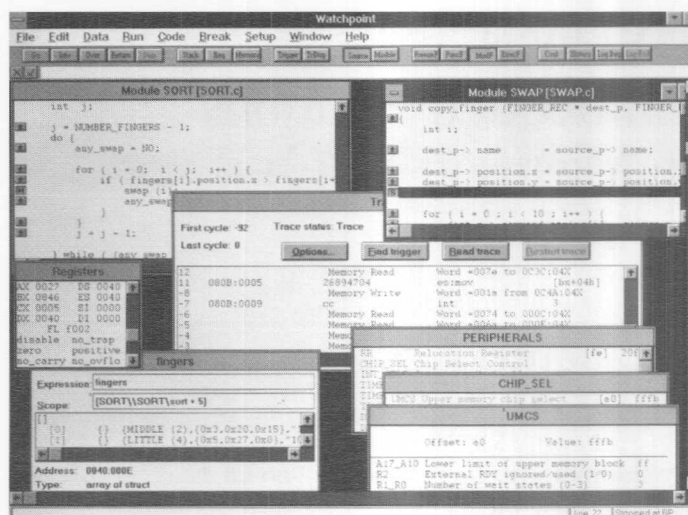
Watchpoint™

Watchpoint™ Microsoft® Windows™-based Debugger

- Display multiple code, data, and status windows
- View source and data with a mouse click
- Watch data update during execution
- Choose to view source or assembly modes separately or in combination in both code and trace windows
- Customize the button bar with preferred commands
- Create macros, build automated test scripts, or replay an entire session using command files

Contact

Sophia Systems and Technology
Sales Department
777 California Avenue
Palo Alto, CA 94304
Tel: (800) 824-9294 or (415) 493-6700



Product Information

Watchpoint is a powerful, full-scale Microsoft Windows-based high-level language debugger that uses Sophia Systems' in-circuit emulators for real-time embedded applications. Residing on the PC, Watchpoint supports the 80C186 as well as other microprocessors. Watchpoint enables you to view any number of code, trace, stack, register, and port windows simultaneously or in combinations.

Setting complex breakpoints and triggers, allocating memory, or setting up the emulator is extremely easy with Watchpoint—the system displays all the available parameters. Many actions are facilitated with a simple point and click; for example, click on a module name to open a code window, on a line to set a breakpoint, or on a variable or expression to see its value.

Additional Watchpoint features include conditional triggers and breakpoints with optional command sequences following, multiple command entry methods, easy setup procedure with retention of startup configurations, a context-sensitive Help system, and a multi-line assembler and disassembler. All emulator functions are controlled via a high-speed parallel link.

Ordering Information

Contact Sophia Systems and Technology at (800) 824-9294 or (415) 493-6700.

Sophia
systems
and Technology

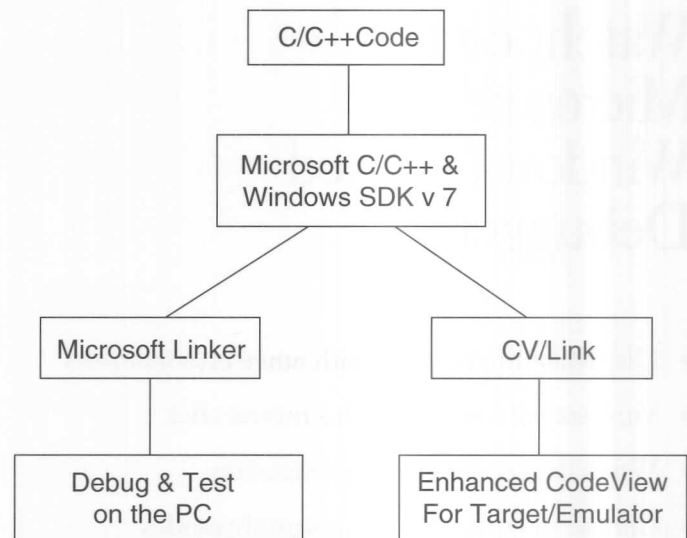
CV/Tools 86

CV/Tools™ 86— Embedded Solutions in Microsoft™ C/C++

- ▶ Microsoft C/C++ and Windows SDK Version 7
- ▶ CV/Link™—an absolute linker/locator
- ▶ Modified run-time libraries—no DOS dependencies
- ▶ Enhanced CodeView for embedded debugging
- ▶ Support for Intel evaluation single-board computer
- ▶ Reconfigurable monitor for single-board computers
- ▶ Interface to emulators

Contact

Systems & Software, Inc.
18012 Cowan
Irvine, CA 92714
Tel: (714) 833-1700
Fax: (714) 833-1900

**Product Information**

The pressure for shorter design-to-market time coupled with increasing product complexity and the movement toward 32-bit processing has surpassed the capabilities of home-grown development tools from multiple sources. Today's embedded-systems developers need a completely integrated, single-source solution. Recognizing this need, Systems & Software, Inc., has developed CV/Tools 86.

CV/Tools 86 is a totally integrated set of x86 real-mode development tools based on the Microsoft C/C++ and Windows SDK Version 7. The CV/Tools base package includes CV/Link 86, an absolute linker that makes code developed with Microsoft C/C++ ROMable. It also includes modified C/C++ run-time libraries that are DOS-independent.

At the core of CV/Tools 86 is SSI's enhanced version of Microsoft's CodeView debugger, which allows remote target debugging in real-time with communication directly to the target system. An in-circuit emulator enables you to debug directly on the hardware for final code optimization.

SSI offers technical support for the entire package of tools, from compiler to debugger. OneCall™ SSI's single-source support program, is your assurance of prompt, knowledgeable answers to your tough programming questions.

CV/Tools 86 supports the following Intel microprocessors: 8086, 8088, i386, or i486 with special enhancements for 80C186EA/EB/EC.

Ordering Information

Call Systems & Software's sales hot line at (800) 788-4386, ext. 500.

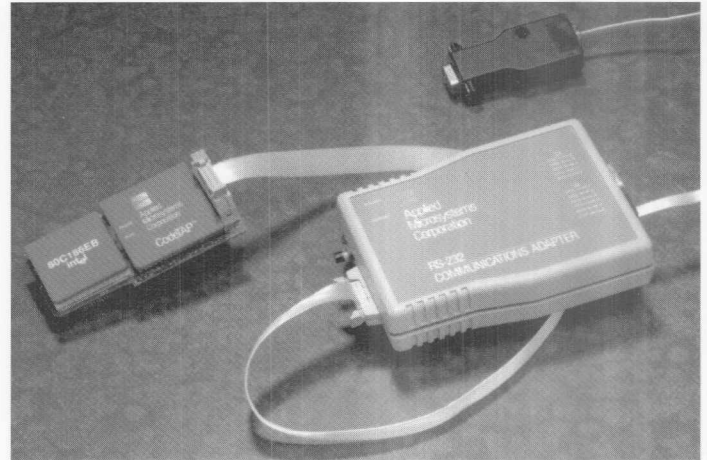
CodeTAP C186

CodeTAP C186 In-Circuit Debugging Tool

- ▶ 8 hardware breakpoints with range capability
- ▶ Software execution breakpoints
- ▶ 4 K trace history
- ▶ Zero-wait-state RAM overlay (80C186/188, EA, XL)
- ▶ High-speed download on standard PC parallel port
- ▶ Real-time execution to 20 MHz
- ▶ Full access to peripheral control registers
- ▶ Full floating-point support
- ▶ Stand-alone or integrated system

Contact

Applied Microsystems Corporation
5020 148th Ave. N.E.
P.O. Box 97002
Redmond, WA 98073-9702
Tel: (800) 426-3925; (206) 882-2000 (in WA)
Fax (206) 883-3049

**Product Information**

CodeTAP® C186 for Intel 80C186/188 EA, EB, EC, and XL microprocessors gives software engineers real-time emulation technology. This compact, affordable tool has all the functions you use most. Plugging directly into your target, CodeTAP doesn't consume target memory, interrupt vectors, or target I/O locations. The 4 K trace buffer supplies a history of microprocessor events to help locate bugs. RAM overlay, which can be mapped in any combination of chip selects, is available for debugging target ROM and PROM.

Broad Compiler Support

CodeTAP works with the standard Intel compiler for C, assembly language, or PL/M. You can also use a variety of other C and C++ compilers including Borland®, Microtec®, Turbo®, and Microsoft® compilers.

Choice of Source-Level Debuggers

For maximum flexibility, CodeTAP C186 offers you a choice of debugger interfaces. Paradigm DEBUG® is an enhanced implementation of the Borland Turbo Debugger. CV/TAP™ is a version of Microsoft CodeView® optimized for embedded development by SSI (Systems and Software). CodeTAP also supports SoftScope® III, a windowed, source-level debugger from Concurrent Sciences®.

Stand-Alone or Part of an Integrated Development System

You can use CodeTAPs independently or in an integrated system of development tools consisting of a high-performance emulator, CodeTAPs, and your choice of source-level debuggers. Cross-network access to all tools is supported.



Applied Microsystems Corporation

I.C.E. 186

The Ultimate 80X86 Family I.C.E.: The Trace 32 Development System

- ▶ The most advanced no-compromise system for logic development and analysis available
- ▶ Complete system control from a multiwindow, multitasking, real-time debugger for C, ADA, PL/M, Pascal, Modula-2, and ASM
- ▶ Control and debugger interfaces for PC-DOS, 386 UNIX, Sun 3, SPARC, HP 9000-300/400/700, VAX/VMS, and DECStation
- ▶ Support for 186, 188, C186, C188, 186EB, and 188EB
- ▶ Ethernet, SCSI, fiber-optic, serial, and parallel host/target interfaces available
- ▶ Expandable to 16 MB of emulation memory and 16 MB of breakpoint memory using static or dynamic RAM
- ▶ Multiprocessor development and debug using special synchronization logic
- ▶ Modular design facilitates simple low-cost conversion to different microprocessors

Contact

BSO/TASKING World Headquarters
333 Elm Street
Dedham, MA 02026
Tel: (617) 320-9400
Fax: (617) 320-9212

Call (800) 458-8276 for detailed product information.

**BOSTON
SYSTEMS
OFFICE
TASKING**

BSO/TASKING In-Circuit Emulation Systems and Logic Analyzers

• Trace 32 I.C.E. Systems

Trace 32 I.C.E. Systems by Lauterbach provide the ultimate technology available for leading-edge microprocessor development. Trace 32 is a universal development system with capabilities that are simply not found in other I.C.E. products. Trace 32 I.C.E. Systems provide in-circuit emulation, logic state and timing analysis, simulation, performance analysis, a universal device programmer, a universal counter/timer, a pattern/stimulus generator, a frequency/pulse generator, communications analysis, and more.

Each instrument is controlled directly from the host workstation or PC, through a sophisticated X or Microsoft Windows interface that includes a powerful multilanguage, multitarget debugger. This multitasking, real-time debugger supports C, ADA, PL/M, Pascal, Modula-2, and assembly language. In addition, all Trace 32 Systems support multiprocessor development and debugging through special synchronization logic, and every system provides four inter-trigger lines to trigger other instruments or accept external triggers.

Standard interfaces include RS-232, RS-422, and optionally high-speed fiber-optic or Ethernet interfaces.

You can configure these options to fit your special development needs. *Upgrade-ability to other micros and other options is the most cost-effective of any I.C.E. system on the market.* Trace 32 supports up to 16 MB of RAM and over 100 popular microprocessors and controllers.

If you require the highest-quality I.C.E. system available, call BSO/Tasking and ask for information on Trace 32.

• NetROM ROM Emulator

Designed around the network

NetROM emulates four 8-bit ROMs of 256 K or 1 MB of ROM to speed you through software development. No more burning and erasing, then plugging and unplugging EPROMs. ROM emulation saves time, effort, and materials, cutting back your development cost.

Now combine these features with a high-speed network interface and the ability to use standard Ethernet protocols to download and access your design from anywhere on the network, even remotely. Your target does not even need a comm port—simply ROM space that can be used by NetROM's virtual UART or serial port.

Over the network, you restart the target and begin your session. NetROM supports TCP, UDP, IP, ICMP, and SLIP protocols and includes Telnet, TFTP, BOOTP, RARP, SNMP, and PING applications.

DS-186

Ceibo DS-186 In-Circuit Emulator

- ▶ Support of 80C186/8/XL/EA/EB/EC and others
- ▶ Full-speed emulation up to 30 MHz
- ▶ 1MB of zero-wait-state mapped memory
- ▶ 8 K frames dynamic trace buffer
- ▶ 1MB hardware breakpoints
- ▶ 115 K baud RS-232C communication link
- ▶ Numeric coprocessor support
- ▶ Supplied with Paradigm Turbo Debugger and Locator
- ▶ Support for Borland, Microsoft, and Intel compilers
- ▶ Full support for C, C++, Pascal, and Assembler

Contact

Ceibo
1 Ballard Terrace
Lexington, MA 02173 USA

USA	Tel: (617) 863-9927	Fax: (617) 863-9649
Germany	Tel: 6151-99320	Fax: 6151-993299
Israel	Tel: 052-555387	Fax: 052-553297
Spain	Tel: 91-4778995	Fax: 91-4779075
Sweden	Tel: 0589-19250	Fax: 0589-16153
Italy	Tel: 051-727252	Fax: 051-727515
France	Tel: 061-855767	Fax: 061-851914
Taiwan	Tel: 02-9160977	Fax: 02-9126641



Product Information

The DS-186 is a real-time in-circuit emulator dedicated to the 80C186/80C188 family of microprocessors. The emulator provides a versatile and efficient tool for debugging, developing, and manufacturing systems designed with these microprocessors. The DS-186 operates with an IBM PC or compatible computer. The software includes a state-of-the-art, source-level debugger designed to support embedded system applications with the power and flexibility of the award-winning Turbo Debugger.

The DS-186 provides 1 Mbyte of zero-wait-state mapped memory. Memory can be mapped in boundaries of 1 KByte with a programmable number of wait states. The system operates up to 30 MHz. Emulation speed is limited by the maximum frequency of the microprocessor placed on the adapter.

The DS-186 has the ability to set 1-Mbyte hardware breakpoints. The program is executed until a specified breakpoint condition is reached.

The trace buffer records 8-Kbyte frames and external test points. The trace display shows the source, assembler, and bus cycles.

The DS-186 accepts Intel OMF-86 and .EXE files. These files are converted by DS-186 utilities to absolute executable format. The following assembler and high-level-language files are supported by DS-186: Borland C++, Turbo C++, Turbo C, Microsoft C, Microsoft C++, Intel iC-86, Intel PLM-86, and more. DS-186 also accepts files generated by Turbo Assembler, Microsoft Assembler and ASM-86.

Support

DS-186 uses standard microprocessors for hardware and software emulation. You can select a different microprocessor by replacing the microprocessor in the adapter or changing the adapter. The system runs at the frequency of the crystal on the adapter or from your hardware clock source. The AD-186 adapter supports 80C186, 80C188, 80C186XL, 80C188XL, 80C186EA, and 80C188EA. Other adapters are available to emulate the 80C186/8/EB and 80C186/8/EC.

CEIBO

CheckMate-C186™

CheckMate-C186™
Emulator

- ▶ 20 MHz operation standard
- ▶ Supports all versions of 80C186 and 80C188 XL and E-Series
- ▶ 10MB-per-second communication speed
- ▶ Plug-in and run operation; fully supports Intel's ONCE™ mode
- ▶ Does not use target ADDRESS or I/O space, Target Interrupts, or Stack space
- ▶ Paradigm DEBUG™ Source Level Debug interface standard
- ▶ Complete hardware event system has two ADDRESS comparators, one DATA Comparator, and instruction STATUS to trigger breakpoint or trace
- ▶ 1 K trace memory qualified by hardware event system
- ▶ 256 K overlay memory standard (optional 512 K and 1 MByte)
- ▶ PC/AT or above hosted

Contact

Mailing Address:	Shipping Address:
P.O. Box 3361	15225 N.E. 90th Street
Redmond, WA 98073	Redmond, WA 98052

North America, Asia, and Europe (other)

Checkmate Systems

Tel: 206-869-7211

Fax: 206-861-3647

Europe (Germany)

D=Systems GmbH

Tel: 49-813-125083

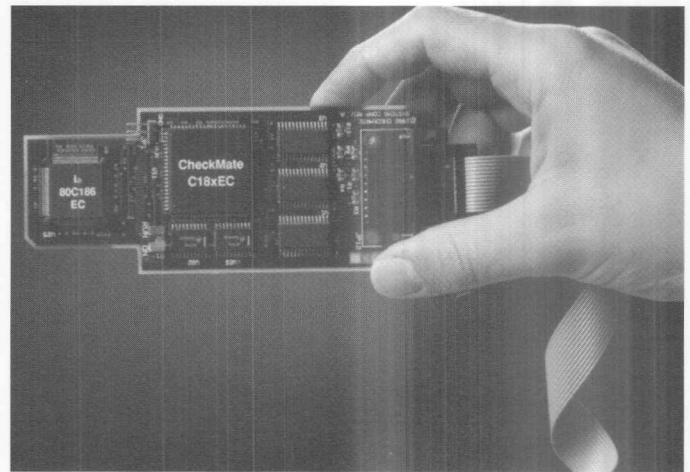
Fax: 49-813-114024

Europe (U.K.)

Great Western Instruments

Tel: 44-272-860400

Fax: 44-272-860401

**Source-level Debug Environment**

CheckMate-C186™ comes complete with Paradigm DEBUG, the industry-standard, source-level debugger interface you demand. Our entire emulator feature set is available directly in the debug environment. Of course, this means that CheckMate-C186™ is compatible with all code generated from any languages supported by the debugger products. In addition, CheckMate-C186™ provides several special capabilities like single screen display, and full edit and save of the Peripheral Control Block register data.

Rich Feature Set**Hardware Event System and Breakpoints**

CheckMate-C186™ provides features that only expensive emulators could in the past. A hardware event system gives you complete hardware breakpoint and trace ON/OFF control. The event system contains ADDR and ADDR RANGE comparators, along with a DATA Comparator that can be masked to the individual bit, and a STATUS comparator. The comparators can be used in any breakpoint combination. In addition, software, "ADDR only", breakpoints are available.

Trace Memory

The CheckMate-C186™ hardware event system can also qualify the contents of the trace memory. The 1 K trace buffer captures all bus traffic with ADDR, DATA, as well as STATUS information, and can be qualified to the individual instruction. A unique feature disables trace over a specified ADDRESS range so the operating system or kernel code is ignored.

Overlay RAM

Overlay memory comes standard with 256 K and it may be mapped into four noncontiguous target address spaces. This memory is Ø wait state at 20 MHz target clock operation.

Ordering Information

Contact factory for pricing.

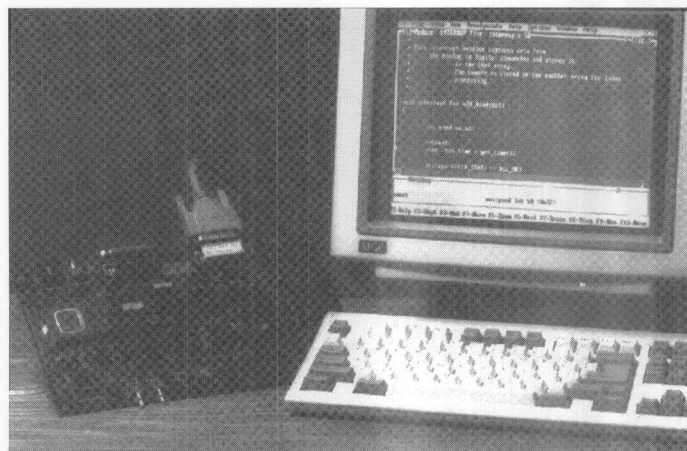
C_thru_ROM

C_thru_ROM
Development Tool Kit

- ▶ Royalty free, no DOS or BIOS required
- ▶ Complete ROM development package for Intel 80x86 CPUs with full Microsoft and Borland C/C++ support
- ▶ Support for Borland's Turbo Debugger for target-system debugging
- ▶ Remote Code View-like source-level debugger (call for Code View support)
- ▶ ROMable startup code boots C programs from a cold boot
- ▶ Compatible with all C memory and floating-point models
- ▶ ROMable library in source including *printf*, *malloc*, *free*
- ▶ Flexibility 80x86 locator, generates binary, Intel hex, and OMF formats
- ▶ Uses standard Microsoft/Borland linker

Contact

Datalight, Inc.
307 North Olympic Ave., Suite 201
Arlington, WA 98223
Tel: (206) 435-8086
Fax: (206) 435-0253
Toll Free: 1-800-221-6630

**Product Information**

C_thru_ROM from Datalight is a complete ROM development package that enables developers to create stand-alone embedded programs using Microsoft and Borland C/C++. The completed embedded program can run on a system with only a CPU, ROM, and RAM, or it can take advantage of a full DOS and/or BIOS.

The C_thru_ROM package, consisting of software and manuals, offers full source-level remote debugging using the Turbo Debugger Remote Kernel or Datalight's Microsoft-compatible remote debugger. The package includes ROMable startup code, a ROMable library, and the locator, which allows the developer to locate the code and data anywhere in conventional memory space.

Standard use with:

- Intel 80x86 CPU
- Microsoft C/C++ through version 7.x
- Borland C/C++ through version 3.x

Support

- Special CPUs supported:
 - 186EB
- UARTs supported:
 - 8250
 - 8251
 - 8256
 - 82530

Ordering Information

- C_thru_ROM \$495
- Products are backed by Datalight's 30-day money-back guarantee.



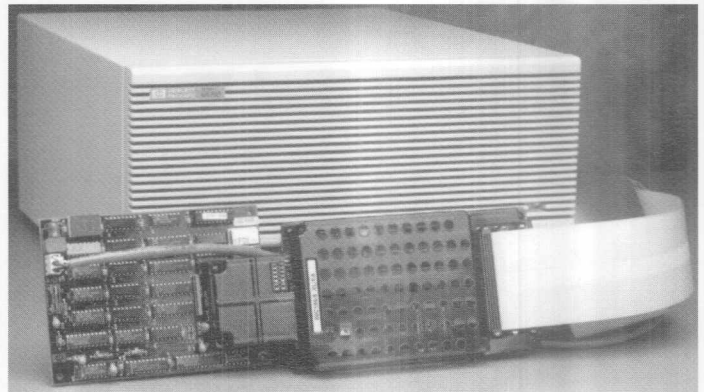
HP 64767-Series

Emulator for Intel
80C186E-Series Processors

- ▶ Emulation support for the entire 80C186E-series family (EA, EB, EC, and XL) and compatibility for older 80C186 and 80186 designs
- ▶ Debugger interfaces and operation on HP 9000s, Sun SPARCstations, or PCs via RS 232, RS 422, or LAN interconnections
- ▶ Real-time, zero-wait-state operation to target or emulation memory to 20 MHz
- ▶ Active probe includes 1 megabyte of emulation memory that covers the entire address space of the processor
- ▶ All emulation memory is fully dual ported in 16 mappable blocks with 1-Kbyte resolution
- ▶ Support for all the popular pin-out packages, including surface mount designs
- ▶ Full symbolic debug support for fast, easy development and debug with HP user interfaces
- ▶ Eight hardware and 32 software breakpoints in conjunction with an internal emulation bus analyzer, available in 1K, 8K, 16K, 64K, and 256K trace depths
- ▶ Real-time analysis of address, data, and status/control information in conjunction with instruction dequeuing of the trace list
- ▶ Symbols and line numbers inserted in the trace list for quick understanding of the code's execution
- ▶ The system includes background and foreground monitors to display and modify registers, peripheral control block, and target or emulation memory

Contact

In the U.S., call (800) 447-3282 for the location of the HP 64000 sales office; for the rest of the world, call the local HP sales office or fax your request to (719) 590-5054.

**Product Information**

The HP 64767A/B/C active probe emulators support a broad selection of the Intel 80C186/188 family of microprocessors through 20-MHz operation. These emulators support the entire 80C186E-series family as well as the 80C186 and 80186 versions. Designers selecting these Intel 16-bit microprocessors are assured of a full line of support with modular tools and software on a wide range of design platforms.

These emulators have active probes to ensure maximum electrical transparency. Active probing permits the use of long 914-mm (36-inch) cables for easy target system access. The emulation probes contain the microprocessor, emulation monitor, run-control circuits, and 1Mbyte of emulation memory. The emulators include background or foreground monitors. Extensive breakpoint capabilities allow flexibility in starting and stopping execution of the code.

Emulation control and emulation bus analyzer cards plug into a modular card cage that connects to the host via RS 232, RS 422, or LAN. Easy-to-use interfaces are available for HP 9000 series workstations and Sun SPARCstations. Equally easy-to-use tools are available for designers using PCs.

For software development, the HP 64767 emulators are supported by the HP embedded debug environment and the HP advanced cross-language system on HP and Sun workstations. The debug environment offers a complete suite of software development and measurement tools to assist in producing high-quality, on-time, specification-compliant code. The debug environment is compatible with the industry's leading language systems for C, C++, and real-time operating systems.

Ordering Information

- 64767A Active Probe Emulator with 1Mbyte of memory for 80C186EA/XL processors with demo board, PGA and PLCC adapters
- 64767B Active Probe Emulator with 1Mbyte of memory for 80C186EB processors with demo board and PLCC adapters
- 64767C Active Probe Emulator with 1Mbyte of memory for 80C186EC processors with demo board and PQFP adapters

Note: Card cage, emulation control, and emulation bus analyzers are ordered separately.



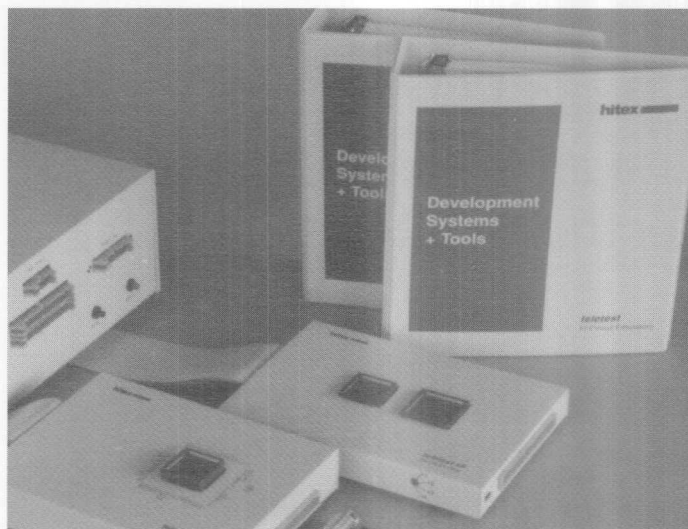
teletest 16

teletest 16

- ▶ In-circuit emulator for 80186 architecture
- ▶ Real-time emulation up to 20 MHz
- ▶ No wait states or target-system restrictions
- ▶ Emulation memory up to 1 MB
- ▶ Two independent trace buffers
- ▶ 8 hardware break/trigger registers
- ▶ Real-time, delay, and event counters
- ▶ SAA-oriented user interface
- ▶ Enhanced HLL-debugging facilities
- ▶ Serial and parallel link to the host

Contact

Hitex GmbH
Greschbachstr. 12
7500 Karlsruhe 41
Germany
Tel: +721 9628-0
Fax: +721 9628-149

**Product Information**

The teletest 16 in-circuit emulator is a modular system for testing 80x86 applications. The system offers powerful support not only for the 80C86/88 and 80286 microcontrollers, but also for all 80C186/188 microprocessors up to a maximum frequency of 20 MHz. The teletest 16 operates without using any target-system resources or wait states, thus offering transparent real-time emulation. The system consists of a basic unit with power supply (110/235 V), emulation memory, two trace buffers, the trigger logic, as well as an emulation pod for the processor-specific features. The EP186_xx emulation pods support many variants of the 80186 microcontroller family simply by inserting the appropriate processor into the corresponding socket located on the pod.

The teletest 16 system uses the SAA-standard HiTOP operating software. HiTOP is the new interactive software for all Hitex in-circuit emulation systems. It allows unrestricted symbolic high-level language debugging for all development environments that generate Intel-OMF format as well as Microsoft and Borland tools. HiTOP provides an extremely user-friendly interface that is tailored to the requirements of 80x86 development work. Over 2,500 teletest 16 emulators have been installed and testify to the powerful features, accuracy, and reliability of the teletest 16 in-circuit emulation system for complex embedded applications.

hitex

ICE™-18x

ICE™-18xEAXL, EB and EC In-Circuit Emulators for the 80C186/80C188

- ▶ Nonintrusive, full-speed, real-time emulation
- ▶ Source-level debug with source and watch window operations
- ▶ 512 K or 1 MByte of zero-wait-state mappable memory
- ▶ Intel windowed human interface
- ▶ Paradigm DEBUG/ICE-18x interface
- ▶ Support for Intel, Borland, and Microsoft languages
- ▶ High-level language symbolic debug
- ▶ Hardware and software breakpoints, fastbreaks, dynamic trace, GPIB support
- ▶ One probe for both 186 and 188 support

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119



Product Information

The ICE™-18x family of in-circuit emulators provides a versatile and efficient tool for developing, debugging, and testing products designed with the 80C186/80C188 family of microprocessors. The emulators include numerous productivity-boosting features to enable you to move your products to market as quickly as possible. The Intel component bondout and advanced cable technology ensure accurate and reliable high-speed emulation. You can select the interface that suits you best: the standard Intel interface or the Paradigm DEBUG/ICE interface. The Intel windowed human interface enables a user to open multiple windows simultaneously, providing source code, watch variables, memory, registers, and trace information. The Paradigm DEBUG/ICE allows users to harness the power and flexibility of Borland's award-winning Turbo Debugger, developed exclusively for debugging embedded applications. A powerful GO command permits precise emulation control through versatile event recognition, conditional constructs, and internal actions, such as full trace buffer and event counters. Breakpoints can be defined on execution and bus addresses as well as memory and I/O cycles. A 4 K trace buffer collects both execution and data bus activity in real time, with the display in either instructions, cycles, or both. C-based macro commands facilitate customized or repeated debug sessions, an extremely useful feature for automated manufacturing testing and debugging. A Stand Alone Self Test (SAST) Unit in conjunction with emulator map memory facilitates early software debugging and emulator confidence testing.

Host

DOS V3.3 or later

System

IBM PC, AT, PS/2, or 100% compatible machines

Memory

640 KBytes of RAM, 1.5 MBytes expanded memory (Intel interface only)

Other

Serial port, math coprocessor, memory options, and conversion probes

Components Supported

- ICE-18xEAXL: 80C186XL, 80C188XL, 80C186, 80C188, 80C186EA, 80C188EA, 80186, and 80188
- ICE-18xEBP: 80C186EB and 80C188EB
- ICE-18xECQ: 80C186EC and 80C188EC

Ordering Information for pICE186EAXL, pICE186EBP, and pICE186ECQ

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK*™ document #2589.

DK80C186Ex DKCV80C186Ex Paradigm and Microsoft/SSI Design Kits

- ▶ Paradigm Design Kits:
 - DK80C186EA/XL
 - DK80C186EB
 - DK80C186EC
- ▶ Intel 186 evaluation board
- ▶ Paradigm DEBUG/RT, enhanced Turbo Debugger
- ▶ Paradigm LOCATE, evaluation version
- ▶ TDREM, turbo debugger remote interface
- ▶ Microsoft/SSI Design Kits:
 - DKCV80C186EA/XL
 - DKCV80C186EB
 - DKCV80C186EC
- ▶ Intel 186 evaluation board
- ▶ Microsoft C/C++ compiler and Windows SDK
- ▶ CV/RTD 86, remote target debugger with remote monitor, not reconfigurable
- ▶ CV/Link, CodeView compatible absolute linker and locator

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

DK80C186Ex DKCV80C186Ex

Product Information

Intel's new family of design kits provides an integrated hardware and software development environment based on the popular Microsoft and Borland languages.

Paradigm Design Kits

These kits combine an Intel 186 evaluation board plus the Paradigm Software Development Kit (SDK). The SDK features Paradigm DEBUG/RT, a custom version of the Turbo Debugger from Borland, that fully supports your Intel evaluation board. In addition, an evaluated version of Paradigm LOCATE is included. Startup code, run-time library, floating-point support, and plenty of working examples are available. The Turbo Debugger Remote Interface (TDREM) is a small kernel that has already been customized to the demands of the Intel evaluation board. All you need is to add your choice of Borland, Intel, or Microsoft compilers.

Microsoft/SSI Design Kits

These kits contain an Intel 186 evaluation board plus the SSI (Systems & Software, Inc.) CV/Tools Development Kit. The CV/Tools kit includes the complete Microsoft, C/C++ compiler package along with tools designed specifically for embedded-systems development. CV/RTD is a DOS-hosted version of Microsoft's CodeView debugger, which communicates directly to the embedded target system via an RS-232 communication link. With CV/Link 86, an absolute linker and locator, Microsoft C/C++ code can be made ROMable for embedded development. The CV/Tools remote CodeView debug monitor comes preconfigured for the Intel 186 evaluation boards offering a complete Microsoft development environment for the C186 EX family.

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK™* document #2589.



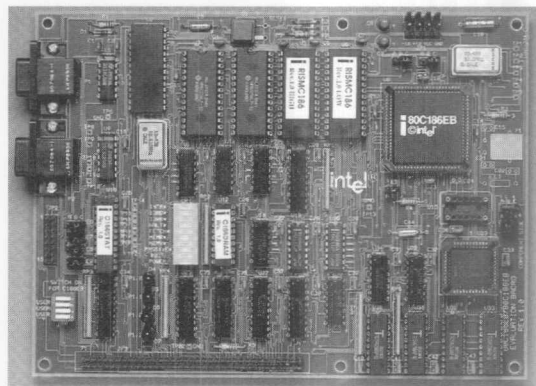
EV80C186EA/XL EV80C186EB EV80C186EC Evaluation Boards

- ▶ Full-speed execution
 - 20 MHz, one wait state for the EV80C186EAXL
 - 16 MHz, zero wait state for the EV80C186EB
 - 16 MHz, zero wait state for the EV80C186EC
- ▶ 32 KBytes (expandable) of SRAM/ROMsim
- ▶ 512 Kbytes of DRAM
- ▶ All CMOS board for low power
- ▶ Supports Intel flash memory
- ▶ Concurrent interrogation of memory and registers
- ▶ 16 software breakpoints
- ▶ 2 single-step modes
- ▶ High-level language support
- ▶ Paradigm or Microsoft debugger (with kit only)
- ▶ RS-232C communication link
- ▶ Easily reconfigured to support 8-bit processor

Contact

Intel Corporation
2200 Mission College Blvd.
Santa Clara, CA 95052-8119

EV80C186EA/XL, EV80C186EB EV80C186EC



Low-Cost Code-Evaluation Tool

Intel's EV80C186EA/XL, EV80C186EB, and EV80C186EC evaluation boards provide a hardware environment for code execution and software debugging at a relatively low cost. Each board features an advanced CHMOS® 16-bit embedded processor that is a member of the industry standard 80C186 family. The boards allow you to take full advantage of the power of the 80C186 architecture. All boards support powerdown and idle-mode operation for development of power-sensitive applications.

The EV80C186EB features two independent serial channels providing a serial link for easy interprocessor communications, diagnostic and modem interfacing for today's "mobile office." Their memory (ROMsim) can be reconfigured to match your planned memory system, allowing for exact analysis of code execution speeds in a particular application. The EV80C186EA/XL and EV80C186EC support Intel flash memory.

Popular features such as a symbolic single-line assembler/disassembler, single-step program execution, and 16 software breakpoints are standard. Intel provides a complete code development environment including assembler (ASM-86) as well as high-level languages such as Intel's iC-86, FORTRAN-86, Pascal-86, and PL/M-86 to accelerate development schedules.

Each evaluation board is hosted on an IBM PC or BIOS-compatible clone, already a standard development solution in most of today's engineering environments. The source code for the on-board monitor (written in ASM-86) is public domain. The program is about 2 Kbytes in length and can be easily modified for inclusion in your target hardware. In addition, third-party vendors can provide retargetable debuggers to further enhance your debug and development process.

Personal Computer Requirements

The EV80C186EA/XL, EV80C186EB, and EV80C186EC evaluation boards are hosted on an IBM PC, XT, AT, or BIOS-compatible clone. The PC must meet the following minimum requirements:

- 512 Kbytes of memory
- One 360-Kbyte floppy-disk drive
- PC DOS v3.1 or later
- A serial port (COM1 or COM2) at 9600 baud
- ASM-86, iC-86, FORTRAN-86, Pascal-86, or PL/M-86 language software
- A text editor such as AEDIT

Ordering Information

Please contact your local Intel Sales Office or Local Intel Distributor. For a list of Intel Distributors call (800) 628-2283 in the U.S. and Canada, or (916) 356-3105 outside the U.S. and Canada, and request *FaxBACK™* document #2589.



186 Accessories

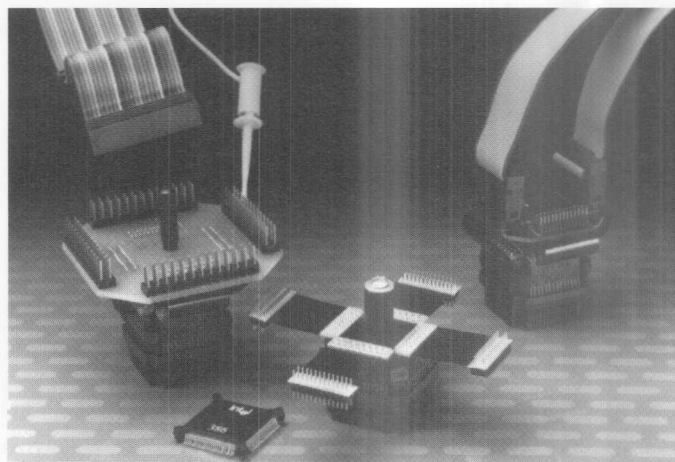
186 Accessories

- ▶ Compatible with the full family of microcontrollers and support chips
- ▶ Full family of test clips for surface-mounted and thru-hole DIP, SOIC, SOJ, PLCC, PQFP, CQFP, MQFP, SSOP, TQFP, VQFP, TSOP, and TSSOP
- ▶ Locking action and two phases of contact alignment
- ▶ Different interfaces available for attachment to your instrument
- ▶ Custom sizes and configurations available by quotation
- ▶ Application support and technical assistance available

Contact

For technical information:
Bob Poirier at ITT Pomona
Tel: (909) 469-2912
Fax: (909) 629-3317

For pricing and availability or literature:
Contact Customer Service at (909)-469-2900

**Product Information**

These test clips are designed to aid emulation, production, or field testing and repair. Pomona offers a broad selection of clips in a wide assortment of configurations and sizes. From DIP clips to QFP clips for ceramic or plastic chips of greater than 200 pins, Pomona makes them all.

Pomona's patented locking clips connect to even the smallest support chip, such as a 20-pin QSOP package with a height of less than 1.4 mm. We also offer clips that handle four-sided SQFP chips with lead pitch of .5 mm and closer.

If you find your device is not included among our listed standards, contact us for a custom quotation. Many of these new configurations can be readily created with our in-house rapid-response capability.

To receive a Surface Mount and IC Test Accessories brochure or Pomona Catalog or to place an order, contact Customer Service.

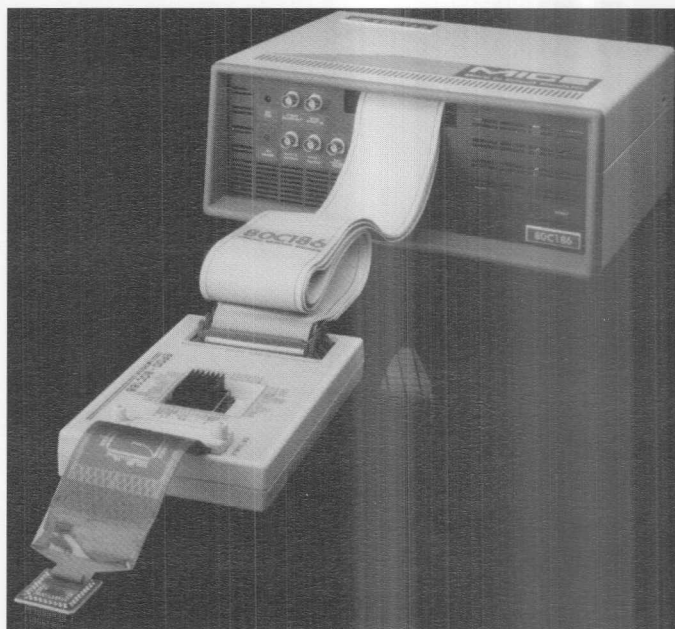
MICE-IIIS-80C186

MICE-IIIS-80C186
In-Circuit Emulator

- ▶ 5 V 80C186/EA/XL or 80C188/EA/XL
- ▶ 3 V 80L186EA8 or 80L188EA8
- ▶ 5 V 80C186/EB with optional package
- ▶ Up to 20 MHz, 100% realtime
- ▶ 1 MB zero-waitstate overlay memory
- ▶ hyperSOURCE source language debugger
- ▶ Optional Paradigm DEBUG V3.1 source language interface
- ▶ High speed parallel interface
- ▶ 32K trace with 100ns timestamp
- ▶ True hardware execution breakpoints
- ▶ 4 addr/data/status/counter bus breakpoints
- ▶ Trigger and trace without stopping emulation

Contact

Microtek International, Inc.
3300 N.W. 211th Terrace
Hillsboro, OR 97124
Technical support: (503) 645-7333
Sales information: (800) 886-7333
Fax: (503) 629-8460

**Product Information**

The MICE-IIIS 80C186 includes Microtek's hyperSOURCE high level debugger, which supports Microsoft C, Borland C, or virtually any toolchain that can create an OMF86 file. The Paradigm/Borland DEBUG interface, version 3.1, is also available as an option.

MICE systems come with one megabyte of overlay memory, *true execution breakpoints*, fully-qualified trace that can be accessed without stopping the emulator, and lower *total cost* than the alternatives.

MICE systems are *very* modular. This means a MICE-III can be upgraded to a MICE-IIIS, or an 80C186 can be upgraded to 80C186EB or other processor, quickly and inexpensively, at the customer's site.

The MICE-III 80C186 offers feature-rich, real-time emulation, fully integrated high-level language interfaces, and full-time technical support with applications experience ranging from aerospace to ultrasound. Save money without sacrificing functionality. Call Microtek today to arrange an on-site *demonstration*.

Host Systems Supported, Processors Supported

Requires 386 PC with 4M extended memory, VGA display, MS-DOS 3.3 or 5.0, and 2M free disc space.

Ordering Information

- MICE-IIIS-80C186/188-PLCC
- MICE-IIIS-80C186/188EB
- MICE-III-80C186/188-PLCC
- MICE-III-80C186/188EB
- MICE-III-8086/8088

MICROTEK

The Leader in Development Systems Technology™

SDT-XF

SDT-XF
In-Circuit Emulator

- ▶ Real-time emulation up to 16 MHz
- ▶ Interchangeable PODs to select other processors
- ▶ HLL debugging in C, PL/M, and PASCAL
- ▶ 8 K by 56 bit selective trace buffer
- ▶ Up to 2 MB of emulation memory
- ▶ Complex hardware breakpoints
- ▶ Software performance analysis
- ▶ DMA support at all times
- ▶ High-speed serial interface to a PC host

Contact

SIGNUM SYSTEMS

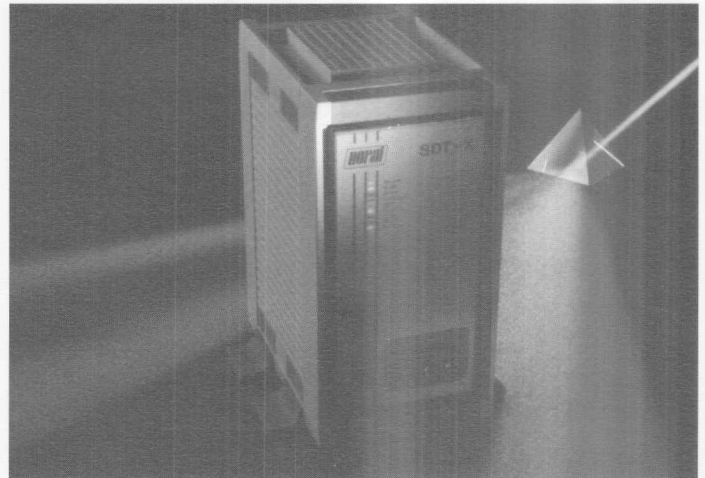
171 E. Thousand Oaks Blvd., #202

Thousand Oaks, CA 91360

Tel: (415) 903-2220 or (805) 371-4608

Fax: (415) 903-2221 or (805) 371-4610

Email: Attmail!Signum

**Product Information**

The SDT-XF gives you true real-time in-circuit development and debugging at any level, machine code to high-level language (HLL).

The SDT-XF comes complete with 128 K of memory; a HLL debugger (PRISM); a 56 bit wide by 8 K deep trace; and a special Event Detect System that uses a combination of comparators, sequencer, external probes, and timer counters to create almost any complex trigger condition. The instruction breakpoint system is specially developed to eliminate execution breaks due to pre-fetch or cache fill mechanisms. Powerful secondary qualifiers allow break on any combination of memory, port, or register values.

The Event Detect System enables you to achieve selective tracing of only meaningful data.

The PRISM Source-level debugger supports Intel, Microsoft, Borland, Microtec Research, and Aztec compilers. You can set or clear an unlimited number of breakpoints with a mouse by simply clicking on the required instruction in the source, mixed, or assembly mode window. Register values that change between single steps are highlighted for easy viewing.

Different family members are supported with just a change of a probe. Currently the SDT-XF supports 8086/88, 80186/80188, 80C186/188, and 80C186/188EB processors. Emulation CPU is mounted on probe assembly, as close as possible to the target system for the best possible emulation.

Ordering Information

Contact our sales office for information.

SIGNUM SYSTEMS

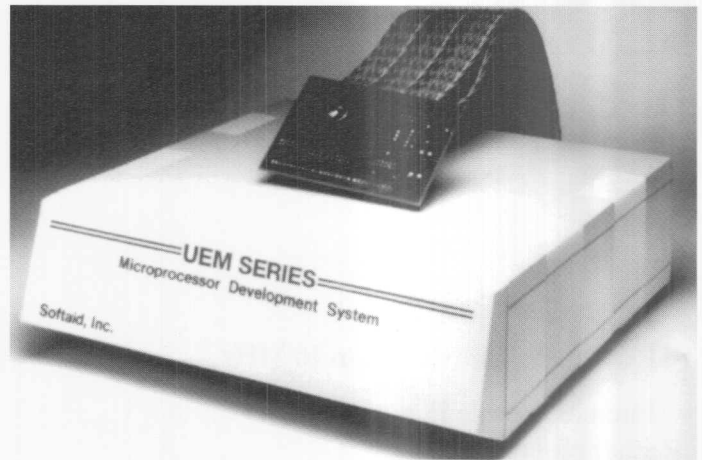
UEM 80186

UEM 80186
In-Circuit Emulator

- ▶ Complete non-intrusive software development
- ▶ Source-level debugger for Windows and DOS
- ▶ 256 K to 1 MB overlay RAM
- ▶ Breakpoint nesting, five levels deep
- ▶ 131,072 hardware breakpoints
- ▶ Memory access monitor
- ▶ Built-in performance analysis
- ▶ Real-time trace
- ▶ Unmatched language support
- ▶ 16–20 MHz operation

Contact

Softaid, Inc.
8300 Guilford Road
Columbia, MD 21046
Sales: (800) 433-8812 or (410) 290-7760
Fax: (410) 381-3253

**Product Information**

Softaid's UEM-80186 emulators are designed to support your 8- and 16-bit development projects and come with everything you need for complete, non-intrusive software development. The UEM-80186 makes no compromises. No wait states are inserted. Refresh is always maintained. Full-speed emulation and all compilers are supported.

The source-level debugger frees you from the drudgery of working in hex; set breakpoints on C source lines, display trace data in the original source, and perform all debugging in the same context as your original code! Variables appear as defined: integers are shown as decimal, pointers reference memory correctly, and variables maintain scope attributes.

With 131,072 hardware breakpoints available, you can set breakpoints on specific data values or combine breakpoints into complex conditions.

The built-in performance analyzer tracks execution time of up to 255 functions simultaneously, in real-time.

The UEM supports all versions of the 186, including the EB, XL, and EA. Inexpensive plug-in boards adapt it to the 68HC16, 68000, Z180, and other processors.

Ordering Information

- Model #: UEM-80186, specify version (EB, XL, or EA)
- Included with emulator:
 - Source-level debugger (Windows or DOS)
 - Complete documentation
 - Serial cable
 - One-year hardware warranty
 - One-year software support
 - One-year BBS access

Optional Features

- 1 MB overlay RAM option
- Parallel download option
- PLCC to LCC adapter
- 20-MHz upgrade

Softaid

CV/Steam 86

CV/Steam 86— The Most Innovative Emulator for the 80C186 Family

- ▶ CodeView debugger support
- ▶ Debug target execution with no wait states at 20 MHz
- ▶ 1-MByte-per-second communications rate
- ▶ Plug in and run operation
- ▶ True transparency—does not use target address or I/O space, interrupt table, or stack space
- ▶ Complete hardware event system uses ADDRESS, DATA, and instruction STATUS to trigger breakpoint or trace
- ▶ 1 K trace memory
- ▶ 256 K overlay memory standard, 512 K and 1 MByte optional

Contact

Systems & Software, Inc.
18012 Cowan
Irvine, CA 92714
Tel: (714) 833-1700
Fax: (714) 833-1900

**Product Information**

The CV/Steam 86 Emulator is a component of CV/Tools, SSI's family of real-mode x86 embedded development tools. CV/Steam 86 is the most innovative and cost-effective in-circuit emulator available for the Intel 80C186/C188, XL, EA, EB, and EC microprocessors.

Designed for ease of use, CV/Steam 86 enables you to begin source-code debugging as soon as it is connected to your target CPU socket or over the surface-mount packages. It operates over the entire 20 MHz clock range of the 80C186 architectures, including the POWER-DOWN and IDLE modes. The high-speed communications rate of 1 MByte per second allows downloading of a 300 KB file in just 6 seconds.

CV/Steam 86 comes equipped with the industry-standard CodeView debugger from Microsoft, which has been enhanced to support embedded development. With these enhancements, the entire CV/Steam emulator feature set is available directly in the debug environment, so you can debug programs written in C, C++, and MASM.

The CV/Steam hardware event system gives you complete hardware breakpoint and trace ON/OFF control. It can also qualify the contents of the trace memory. The 1-K trace buffer captures all bus traffic with ADDRESS and DATA as well as STATUS information, and can be qualified to the individual instruction.

Overlay memory comes standard with 256 Kbytes. It can be mapped into four non-contiguous target address spaces.

System Requirements

- IBM PC/AT 386 or compatible
- 2 MB RAM minimum
- MS-DOS 3.0 or later
- 20 MB hard-disk space
- One PC/XT card slot

Ordering Information

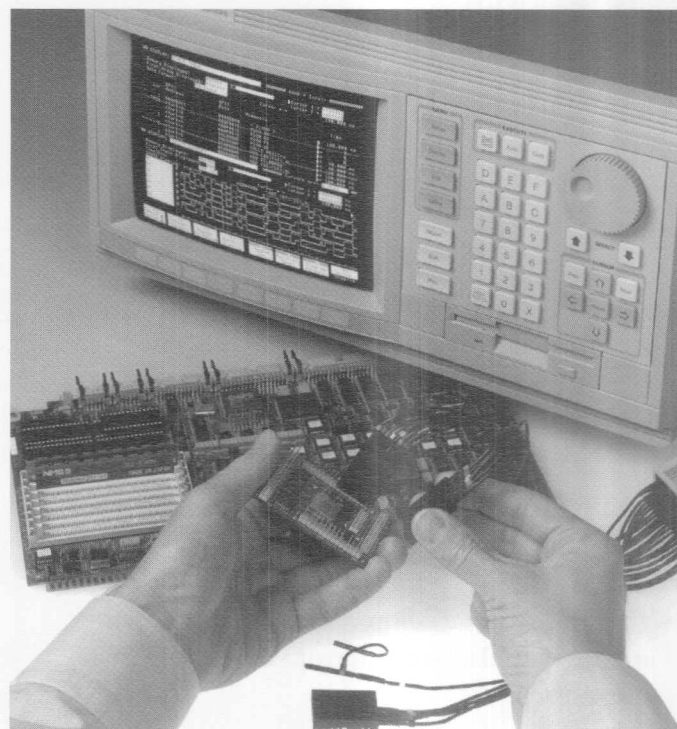
Call Systems & Software's sales hot line at (800) 788-4386, ext. 500.

32GPX and 32DM06 DAS9252 and 92DM05/06

- ▶ Real-time symbolic debug of 186-architecture systems
- ▶ Trace identifies instructions actually executed and branches taken
- ▶ Single connection probe adapters for most 186-architecture devices
- ▶ 80-MHz state acquisition
- ▶ Timing analysis on all channels
- ▶ Perform bus timing measurements through probe adapter
- ▶ ROM emulation
- ▶ Real-time performance analysis
- ▶ Links to high-level languages
- ▶ Prices start at \$9,000

Contact

Tektronix, Inc.
National Marketing Center
P.O. Box 4600 M/S 94-860
Beaverton, CA 97076
Tel: (800) 426-2200



Product Information

The GPX Logic Analyzer is a general-purpose instrument with features for everyone on the design team. Complete systems for microprocessor analysis start at \$9,000. The GPX series comes in a 3001GXP monolithic unit or a 3002 modular mainframe. Both units offer a 64-MB hard disk and an MS-DOS compatible floppy for data storage, keyboard, and a variety of monochrome and color displays. The GPX offers 80 to 160 channels of 80-MHz state acquisition; 200-MHz transitional timing analysis on all channels; 16 to 32 channels of 1-GHz timing acquisition (40 K deep); true simultaneous state and timing analysis without double probing; ROM emulation; real-time performance analysis; and links to high-level languages such as C, C++, Pascal, and Ada.

The DAS9200 Digital Analysis System is a modular instrumentation platform that you can operate locally using a color X-terminal or from a workstation via a standard X11/R4 server. Host communication is supported via LAN, RS-232, or GPIB. A highly integrated DAS9200 acquisition module addresses the demanding requirements of the fast, wide complex buses of today's microprocessors. You can use multiple modules to support multiple microprocessors with no compromises in speed or timing. Memory depths from 32-K to 128-K samples lets you capture both the symptom and cause of complex problems. The DAS9200 offers software performance analysis at full speed with up to 5,000 symbolic ranges.

CSI-LINK is a PC-based software product that provides a link between Tektronix logic analyzers and almost any X86-family software tools. It extracts high-level symbol information from the object module and converts it to a format that can be downloaded to Tektronix logic analyzers to facilitate symbolic display and triggering.

Tektronix



Universal Programmers

Advin Systems, Inc.	PILOT-145 E/EPROM & MC Programmer.....	106
Advin Systems, Inc.	PILOT-U40 Universal Programmer.....	107
B&C Microsystems, Inc.	PROTEUS104 Universal Programmer System.....	108
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PILOT-145

PILOT-145 E/EPROM and Microcontroller Programmer

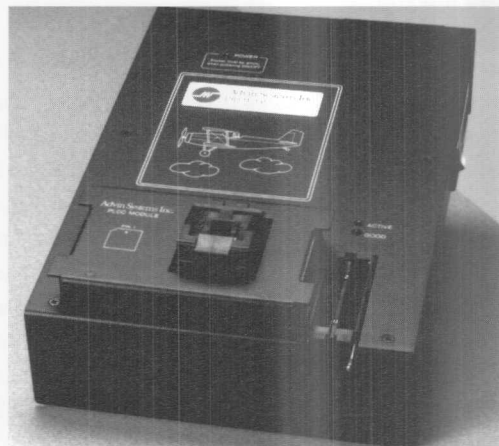
- ▶ All members of the 87C51 family are supported
- ▶ Controlled by IBM PCs/Notebooks or compatibles
- ▶ Standard parallel printer port interface, no PC slot required
- ▶ No personality modules required
- ▶ Powerful, flexible and friendly software
- ▶ Free lifetime software updates via high speed BBS
- ▶ Industrial quality
- ▶ Recognized by major semiconductor manufacturers

Contact

Advin Systems Inc.
1050-L East Duane Avenue
Sunnyvale, CA 94086
Tel: (800) 627-2456 or (408) 243-7000
Fax: (408) 736-2503 BBS: (408) 737-9200

Distributors

	<i>Voice</i>	<i>Fax</i>
Australia: Kenelec	(3) 560-1011	(3) 560-1804
Belgium: Suminvent	(55) 31.37.37	(55) 31.43.99
Canada West: J&F	(604) 986-1286	(604) 986-2216
Canada East: Multitest	(416) 609-8396	(416) 609-8399
England: Quarndon	(332) 32651	(332) 360-922
France: Antycip	(1) 3961-1414	(1) 3076-2973
Germany: Lascar	7459-1271	7459-2471
Hong Kong: Universal	833-5188	941-5930
Singapore: Benchmark	(65) 299-1605	(65) 299-1625
Sweden: Instr. Ctr.	46-589-19250	46-589-16153



Product Information

PILOT-145 is the most cost-effective and reliable solution for programming devices of the 87C51 family, as well as EPROMs, EEPROMs, and FLASH devices. It is controlled by Advin's easy-to-use and fast software, operating on IBM PCs or compatibles. Since the PC interface is through a standard parallel printer port, no PC slots are required. Therefore, you get the benefit of easy portability from one PC to another. You can also operate it from a notebook computer via its standard printer port. Compared with serial-port controlled units, PILOT-145 gives you a much faster throughput and straightforward plug-and-go interface.

Its versatile software allows you to read and save different kinds of data files including binary, all kinds of Intel hex, and all kinds of Motorola hex. The buffer offset and file address commands allow you to put data exactly at the locations you want. The full-screen editor allows you to edit data in both hex and ASCII strings.

Its macro/batch facility allows you to collect frequently used commands in a macro file that can be submitted later for fully automated operations. This and other popular features make the PILOT-145 a time-saving instrument for you. It also shortens the training process for your production people.

Advin Systems Inc. has been a dependable and responsive supplier of reliable programming instruments for over six years. It is recognized by major IC manufacturers including Intel, AMD, and Philips/Signetics. For quality-conscious engineers who need almost instant support when new devices come to market, Advin's small-company, high-quality mentality fits very well.

Supported Devices

- Intel: 87C51, 87C51FA, 87C51FB, 87C51FC, 87C252, 8751BH, 8751H, 8752BH, 87C54, and 87C58, etc.
- AMD: 8751H, 8753H, 87C51, 87C52, 87C521, and 87C541, etc.
- Philips/Signetics: 87C51, 87C52, 87C528, 87C550, 87C652, and 87C654; optional: 87C451, 87C552, 87C751, and 87C752, etc.
- EPROMs, EEPROMs, and FLASH: up to 4-MEG devices from all major manufacturers, including 28F010, 28F020, 28F040, 29C256, 29C512, 29C010, and 29F010, etc.

Ordering Information

- PILOT-145: \$795 (USA price only). Includes interface cable, software, manual, 1-year warranty, 30-day money-back satisfaction guarantee.
- PILOT-U40: \$1,995 (same as PILOT-145, but also supports PALs, EPLDs, GALs, FPGAs, etc.); PLCC, SOIC, PGA, and QFP modules are optional.



PILOT-U40

PILOT-U40 Universal Programmer

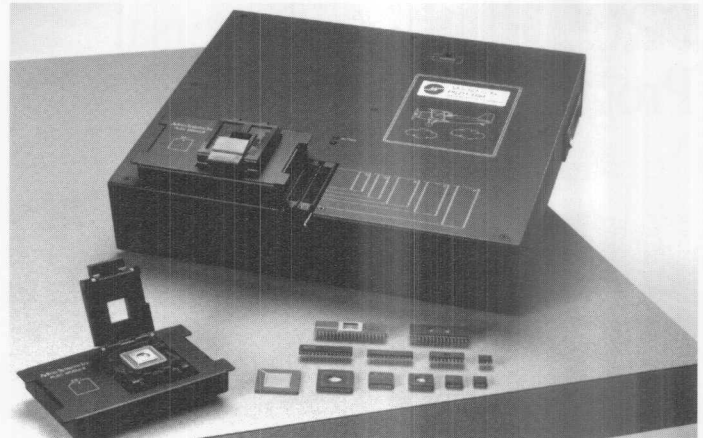
- ▶ All members of the 87C196 and 87C51 families, as well as EPROMs, PALs, etc. are supported
- ▶ Controlled by IBM PCs/Notebooks, or compatibles
- ▶ Standard parallel printer port interface, no PC slot required
- ▶ Powerful, flexible, and friendly software
- ▶ Free lifetime software updates via high speed BBS
- ▶ Industrial quality
- ▶ Recognized by major semiconductor manufacturers

Contact

Advin Systems Inc.
1050-L East Duane Avenue
Sunnyvale, CA 94086
Tel: (800) 627-2456 or (408) 243-7000
Fax: (408) 736-2503 BBS: (408) 737-9200

Distributors

	<i>Voice</i>	<i>Fax</i>
Australia: Kenelec	(3) 560-1011	(3) 560-1804
Belgium: Suminvent	(55) 31.37.37	(55) 31.43.99
Canada West: J&F	(604) 986-1286	(604) 986-2216
Canada East: Multitest	(416) 609-8396	(416) 609-8399
England: Quarndon	(332) 32651	(332) 360-922
France: Antycip	(1) 3961-1414	(1) 3076-2973
Germany: Lascar	7459-1271	7459-2471
Hong Kong: Universal	833-5188	941-5930
Singapore: Benchmark	(65) 299-1605	(65) 299-1625
Sweden: Instr. Ctr.	46-589-19250	46-589-16153



Product Information

PILOT-U40 is the most cost-effective and reliable solution for programming devices of the 87C196 family, as well as other micro-controllers, memories, and logic devices. It is controlled by Advin's easy-to-use and fast software, operating on IBM PCs or compatibles. Since the PC interface is through a standard parallel printer port, no PC slots are required. Therefore, you get the benefit of easy portability from one PC to another. You can also operate it from a notebook computer via its standard printer port. Compared with serial-port controlled units, PILOT-U40 gives you a much faster throughput and straightforward plug-and-go interface.

Its versatile software allows you to read and save different kinds of data files including binary, all kinds of Intel hex, and all kinds of Motorola hex. The buffer offset and file address commands allow you to put data exactly at the locations you want. The full-screen editor allows you to edit data in both hex and ASCII strings.

Its macro/batch facility allows you to collect frequently used commands in a macro file that can be submitted later for fully automated operations. This and other popular features make the PILOT-U40 a time-saving instrument for you. It also shortens the training process for your production people.

Advin Systems Inc. has been a dependable and responsive supplier of reliable programming instruments for over six years. It is recognized by major IC manufacturers including Intel, AMD, and Philips/Sigmetics. For quality-conscious engineers who need almost instant support when new devices come to market, Advin's small-company, high-quality mentality fits very well.

Supported Devices

- Intel 8797BH, 8797JF, 87C196KB, 87C196KC, 87C196KD, 87C196KR, 87C197NT, 87C196KQ, 87C194, and 87C198, etc.
- Supported packages: PLCC, LCC, QFP, and PGA
- Other supported devices: EPROMs, EEPROMs, FLASH memories, bipolar PROMs, serial PROMs, PALs, EPLDs, GALs, MACHs, MAXs, pLSIs, etc.

Ordering Information

- PILOT-U40: \$1,995 (USA price only). Includes interface cable, software, manual, 1-year warranty, 30-day money-back satisfaction guarantee. PLCC, SOIC, PGA, and QFP modules are optional.



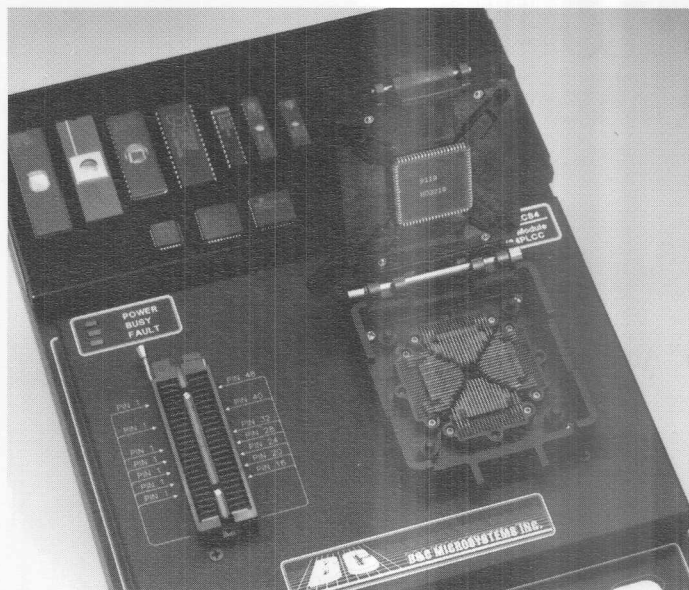
PROTÉUS104

PROTÉUS104 Universal Programmer System

- ▶ All device types/packages supported
- ▶ Direct support of DIP & PLCC packages
- ▶ Programs and tests I/O and Memory Cards
- ▶ Up to 104 resident pin drivers
- ▶ Hosted by IBM/Centronics parallel port
- ▶ Diagnostics and true self-calibration
- ▶ 100% device/socket continuity test
- ▶ Algorithm development software included
- ▶ Supports all popular file formats
- ▶ Pin drivers fully overvoltage/overcurrent protected

Contact

B&C Microsystems, Inc.
750 North Pastoria Avenue
Sunnyvale, CA 94086
Tel: (408) 730-5511
Fax: (408) 730-5521



Product Information

The PROTÉUS104 Universal Programmer is a "System of Programmers" based on a single main unit and a series of programming modules. Available are two universal modules for all devices, 8- or 16-socket gang modules for E/EEPROMs and microcontrollers, a 16-socket gang module for IC memory cards, and an in-circuit module for on-board programming. All modules mount onto the main unit via a 200-pin docking area.

The main unit houses the analog and digital pin drivers, which are plug-in and expandable. You can select from any model level initially, and you can upgrade to any other level as your needs change. The range of selection of pin drivers is from 24 pins, with 40-pin DIP module, to 104 pins with a choice of universal and/or gang modules. You can instantly reconfigure the system inter-changing program modules. The software recognizes hardware configuration and presents the appropriate capability automatically.

The software is easy to use, menu-driven, and efficient. (Available in free demo disk, P/N PRODMO, including the *Guide to Evaluating Programmers*.) System software includes ADEL (Algorithm DEvelopment Language), which provides on-site algorithm development in a special user library, particularly useful for special testing during research and development.

Supports automatic IC handlers for production environments or can be configured for portability with a palmtop or laptop computer.

Ordering Information

To receive detailed specifications and a free demo disk, contact our sales department and ask for demokit P/N PRODMO.



BP-1200 UDP

BP-1200 Universal Device Programmer

- ▶ Accepts any standard file format
- ▶ Includes built-in data editor
- ▶ Provides free software updates via BBS
- ▶ Provides automatic self-calibration
- ▶ Includes program secure function
- ▶ Connects to a standard parallel printer port
- ▶ Supports all device technologies
- ▶ Supports all package types
- ▶ Offers toll-free technical support

Contact

BP Microsystems, Inc.
10681 Haddington Dr.
Houston, TX 77043
Tel: (800) 225-2102 or (713) 461-9430
Fax: (713) 461-7413



Product Information

The BP-1200 uses the latest technology to satisfy your programming requirements at a reasonable price. Leading the competition in devices supported, performance, ease of use, and cost of ownership, the BP-1200 is clearly the best choice for demanding users.

The ability to program almost every device—including the fastest and largest PLDs and memories available—gives you the freedom to choose the optimum device for new designs. Helping to get products to market faster, the BP-1200 connects directly to your PC, saving many valuable hours during product development by speeding up the program-and-test cycle.

For production, the BP-1200's ease of use, high yields, high speed, and reliability increase efficiency and eliminate headaches in either an autohandler or a manual production environment. Best of all, the BP-1200 can be upgraded to meet your future requirements through expandable hardware that can support advanced devices with up to 240 pins, and through free software updates available 24 hours a day from our electronic bulletin board system. Algorithms are released approximately every two weeks for new device support and immediately for bug fixes. Enhanced software is available to support engineering, QC, and production applications that go beyond mainstream requirements.

Our achievement in bringing customers the highest-quality programming system at a fair price is unparalleled. The BP-1200's concept is simple: it's the *best programmer* available at any price.

2900/3900

2900/3900 Programming Systems

- ▶ Programs microcontrollers, PROMs, EPROMs, PLDs, and FPGAs
- ▶ Provides up to 88 universal pin drivers
- ▶ Supports PLCC, QFP, SOIC, PGA, and TSOP
- ▶ Provides parallel test vector application
- ▶ Provides serial set programming
- ▶ Provides high-speed (115-K baud) serial download
- ▶ Automatically configures for host
- ▶ User-installed updates via disk
- ▶ Access to new devices via BBS
- ▶ 2900 is fully upgradable to a 3900 system

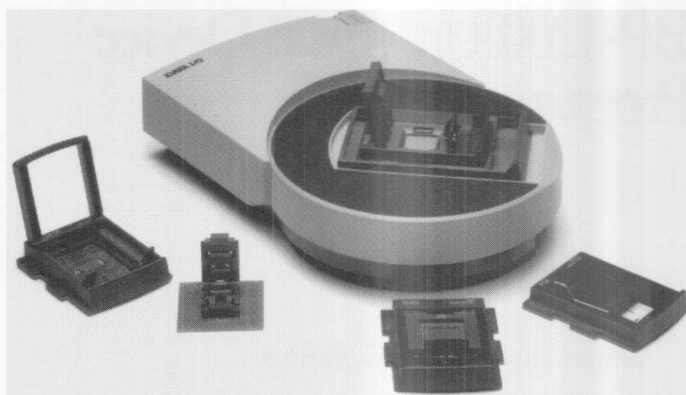
Ordering Information

- D2900MEMSYS—2900 Programming System:
 - 2 MB RAM
 - 5 1/4" utility disk
 - User manual
 - LIB1 (EPROM library)
 - \$4,190 (U.S. list price)
- D3900SYS—3900 Programming System:
 - 2 MB RAM
 - 5 1/4" utility disk
 - User manual
 - LIB1 (EPROM library)
 - LIB5 (PLD library up to 28 pins)
 - \$7,935 (U.S. list price)

Contact

Data I/O Corporation
 10525 Willows Road N.E.
 Redmond, WA 98052
 Tel: 1-800-3-DATAIO (1-800-332-8642)
 Fax: (206) 869-7423

DATA I/O



Product Information

The 2900/3900 Programming Systems provide universal device support for your most advanced designs while keeping programming costs down. The device programmers support thousands of FPGAs, PLDs, memory devices, and microcontrollers, up to 88 pins. For flexibility and affordability, this support is offered in device libraries, so you pay only for the support you need, when you need it. Start with a single device library and add additional libraries when you're ready. Or, buy the full set of libraries for up-front, comprehensive support.

With the proliferation of pinout standards, you can no longer predict which pins will need programming signals, power, or ground. That's why the 2900 and 3900 have power and ground on every pin. And, universal pin-driver technology automatically reconfigures the programming site for the device being programmed, so it can program virtually all devices in the same programming site.

For safe, easy handling of surface-mount devices (SMDs), the 2900 and 3900 feature Data I/O's MatchBook™ device carriers. MatchBooks are durable plastic carriers which accurately align the SMD in the programming site. Each MatchBook set accommodates an entire package family, replacing the traditional fragile, costly SMD sockets.

Host Systems Supported

- Any IBM® PC, XT, AT, portable or PS/2-compatible computer via PROMlink-6™ PC/Programmer Interface Software
- Compatible with any platform running terminal-emulator software

3000, 5000, and 6000

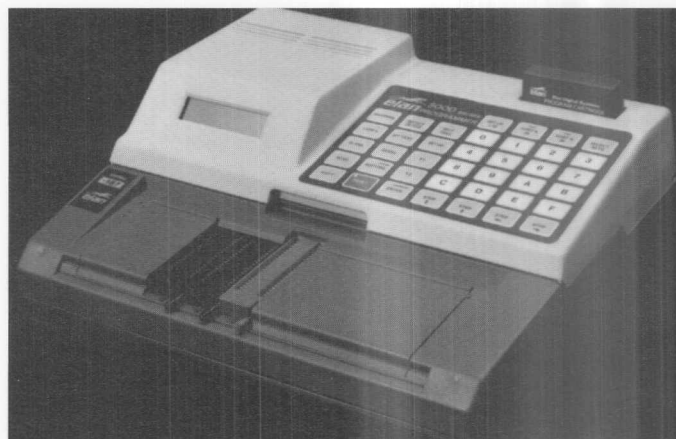
Universal Programmer Families

- ▶ Stand alone or PC remote with full Intel recognition
- ▶ Support for microcontrollers, E/EEPROMS, FLASH, EPLD, GAL, CMOS, in DIP, LCC, PLCC, and more
- ▶ Support for all major download formats
- ▶ Fast, manufacturer-approved algorithms
- ▶ Versatile 3000 and 5000 accept various ZIFPACS for other devices or gang/set programming
- ▶ 6000 universal pin driver single-socket programmer has latest device support and is expandable beyond 200 pins
- ▶ Instant CHECKSUM, READ, BLANK, and VERIFY
- ▶ One-year warranty with free updates

Contact

Elan Systems, Inc.
365 Woodview Ave. #700
Morgan Hill, CA 95037

Elan Digital Systems LTD
Elan House
Little Park Farm Road
Segensworth West, Fareham, PO15 5SJ
Hants, UK



Product Information

Elan is a major source of programming support for Intel devices and is the first to market with algorithms and adapters to support new microcontrollers and socket configurations.

A wide range of front-porch "ZIFPACS" adapt the 3000 and 5000 to every conceivable device that you may want to program.

System operations include file transfers, configure, edit, self-test, and calibrate. All standard translation formats are supported. Device operations include copy, load, program, verify, checksum, ID test, illegal bit check, blank check, and erase.

The 6000 system is a PC controlled universal system supporting Intel 8- and 16-bit MCUs, Flash memory, and all ELPDs connecting to your PC parallel port. It is expandable to more than 100 universal pin drivers internally.

Elan is the North American engineering and support facility for Elan Digital Systems, manufacturers of programmers for microcontrollers, memory devices, logic devices, IC (PCMCIA) cards, and reader/writers for IC cards.

Host Systems

- IBM PC
- XT
- AT
- Compatibles

Processors Supported

- 8741/42/44/48/49/51/52/54/55/58
- 87C51/52/54
- 8797
- 8798
- 87C196/198
- All variations and all socket versions including DIP, PDIP, SOP, QFP, CLCC, PLCC, PGA, and LCC.

Ordering Information

- In North America, call Elan Systems, Inc. at (800) 541-ELAN or (408) 778-7267; fax: (408) 778-2597.
- In Europe and Asia, call Elan Digital Systems, Ltd. at 44-0489-579799; fax: 44-0489-577516.
- Availability is generally from stock.

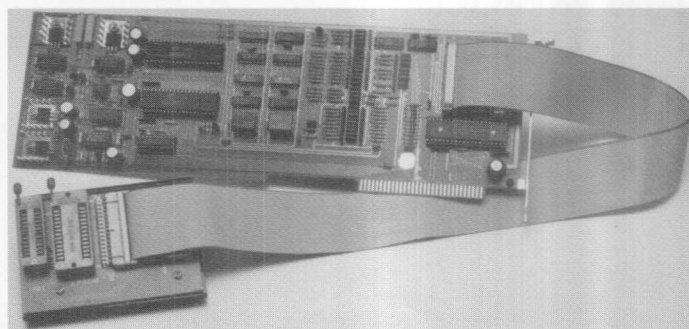
CLK-3100

Universal Device Programmer CLK-3100

- ▶ PC-based programmer
- ▶ Low cost
- ▶ Encryption array editing and programming
- ▶ Security bit editing and programming
- ▶ Supports: 8751, 87C51, 87C51-Fx, 87C51-Gx, 8752-BH, 87C54, 87C58, 87C196-KC, 87C196-KD, PLCC, LCC, QFP, and DIP
- ▶ Full screen editor with simultaneous display of hex and ASCII
- ▶ Also supports FLASH, EPROM, EEPROM, GAL, PAL, PEEL, EPLD, and more
- ▶ Lifetime *free* software updates on BBS

Contact

Link Computer Graphics, Inc.
369 Passaic Ave, Suite 100
Fairfield, NJ 07004
Tel: (201) 808-8990
Fax: (201) 808-8786



Product Information

The CLK-3100 programmer is a PC-compatible card and software system that allows an IBM compatible computer to program microcontrollers, PALs, GALs, EPROMs, FLASH EPROMs, and EEPROMs. This software-configurable card quickly sets up to program many devices. Free lifetime software updates are available on our 24-hour BBS system.

MICRO/Flash/EPROM/EEPROM Functions

The software provides functions necessary to control programming. Some commands include Byte Split/Merge, Read, Write, Verify, Blank Check, Copy, File save and load, Batch mode, and Print Buffer. The full-screen editor provides hex and ASCII edit modes. Program data formats supported include Intel hex, Motorola S Record, binary, ASCII, and buffer image.

PAL/GAL Functions

The CLK-3100 currently supports devices manufactured by: Intel, Lattice, SGS, ATMEL, MMI, National Semiconductor, Texas Instruments, Cypress Semiconductor, Ricoh/Panatech, Samsung, and Altera.

Ordering Info

- 875x adapter supports: 8751, 87C51, 87C51-FA, 87C51-FB, 87C51-FC, 87C51-GA, 8752-BH, 87C54, and 87C58.
- 8751-GB adapter supports 87C51-GB.
- 87196-KC adapter supports 87C196KC and 87C196-KD.
- 874x adapter supports: 8741A, 8741AH, 8742AH, 8748, 8748H, 874AH, 8749, and 874H.
- CLK-3100 Device Programmer \$475
- 875x adapter \$75
- 87C51-GB \$150
- 874x adapter \$75
- 87C196 adapter \$150
- 44-pin PLCC adapter \$75



Link Computer Graphics, Inc.

ALLPRO-88 Family

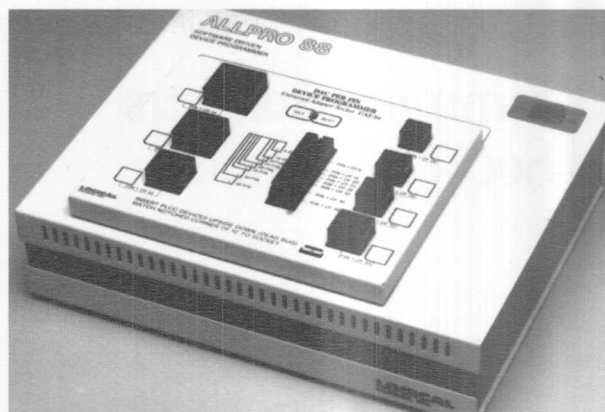
ALLPRO-88 Family of Engineering Development and Programming Tools

- ▶ Programs over 4,000 microcontrollers, EPROMs
- ▶ PROMs, PLDs, and FPGAs
- ▶ Uses proprietary DAC-PER-PIN patented architecture
- ▶ Allows rapid expansion of device library
- ▶ Supports most embedded controllers
- ▶ Supports the MCS[®]-96 and MCS[®]-51 architectures
- ▶ Offers DOS or Windows user interface software
- ▶ PC-based or RS-232 serial versions
- ▶ Supports 8-, 16-, 32-bit formats
- ▶ Provides set programming, file splitting
- ▶ Provides hex editor
- ▶ Offers optional universal cross assembler
- ▶ Offers optional PLD compiler
- ▶ Offers optional emulator for memory or controllers

Contact

Logical Devices, Inc.
692 S. Military Trail
Deerfield Beach, FL 33442
Tel: (305) 428-6868
Fax: (305) 428-1811
BBS: (305) 428-8014
Call today for a free demo disk and catalog: (800) 331-7766.

LOGICAL
DEVICES, INC.



Product Information

Logical Devices, Inc., is a leading supplier of engineering development tools, particularly relating to all phases of programmable device technologies. Logical Devices manufactures over 25 different types of device programmers, UV erasers, and software products. The ALLPRO-88 family of products are Universal DAC-PER-PIN programmers designed to program any current or future devices with software algorithm updates. The product can support devices as large as 88 pins directly and as large as 256 pins with an outboard expansion chip site.

Product Listing/Prices

Husky-1	
Semi Universal Programmer	\$299
Chipmaster, Universal 40 pin	\$995
Allpro88/40 Universal 88 pin	\$2995

Host Systems Supported

- IBM PC
- PS2
- Sun SPARCstation
- Macintosh

Partial Devices Supported

- 8751
- 87C51
- 87C751/2
- 87C196/197
- 8748
- 8749
- 8741/2
- 8755

Call for a *free* master device list describing a list of over 4,000 devices supported on a variety of programs.

Order Information

- Terms: COD, Visa, MasterCard, American Express, Net 30
- Full money-back guarantee program
- Leasing: 0% easy qualification lease available
- Product warranty: one year
- *Free with this ad:* one year software maintenance on any product sold

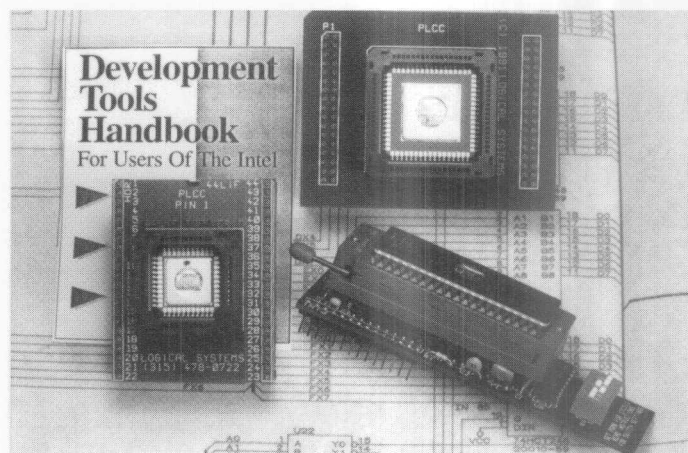
8051 Adapters

8051 Family Programming Adapters and Socket Adapters

- ▶ Use new devices on your current programmer
- ▶ Program 87C51s, 'GBs, '552s, '451s, and others in common footprints
- ▶ Eliminate expensive new equipment purchases
- ▶ Easy-to-use; no software
- ▶ Receive friendly technical support
- ▶ High-quality Textool, Yamaichi, and Enplas sockets
- ▶ Priced from \$115 to \$179
- ▶ 30-day satisfaction guaranteed
- ▶ New designs being released all the time; call us with what you need

Contact

Logical Systems Corporation
P.O. Box 6184
Syracuse, NY 13217-6184
Tel: (315) 478-0722
Fax: (315) 475-8460



Product Information

<i>Adapter</i>	<i>MCS-51 Devices</i>	<i>Purpose</i>
PA51-44	87C51, '52, -FA, -FB, -FC	Program 44-pin PLCC devices in 40-pin DIP footprint
PA52-QFP	87C51, '52, -FA, -FB, -FC	Program 44-pin QFP devices in 40-pin DIP footprint
PA51-FC	87C51, '52, -FA, -FB, -FC	Program 40-pin DIP 87C51 family member in 27512 DIP footprint
PA51-GB	87C51-GB PLCC	Program 68-pin PLCC 87C51-GB in 87C51 DIP footprint
UPA87C51	8751H, 87C51, '52, -FA	Program 40-pin DIP 87x51 family member in 2732A DIP footprint
DA51-DP	87C51, '52, -FA, -FB, -FC	Plug 40-pin DIP device into 44-pin PLCC production socket. 40 DIP ZIF to 44 PLCC plug
DA44-PP	87C51, '52, -FA,	44-pin PLCC socket extender. Test socket accepts PLCC device. PLCC plug fits production socket.
DA68-PP	87C51-GB, '451, '552	68-pin PLCC socket extender. Test socket accepts PLCC device. PLCC plug fits production socket.

Ordering Information

- Visa, MasterCard, Discover, American Express, COD, or pre-payment by check. Purchase orders accepted from approved companies.
- UPS ground delivery included.
- For custom work, contact Mitchell Burko.

LOGICAL
SYSTEMS

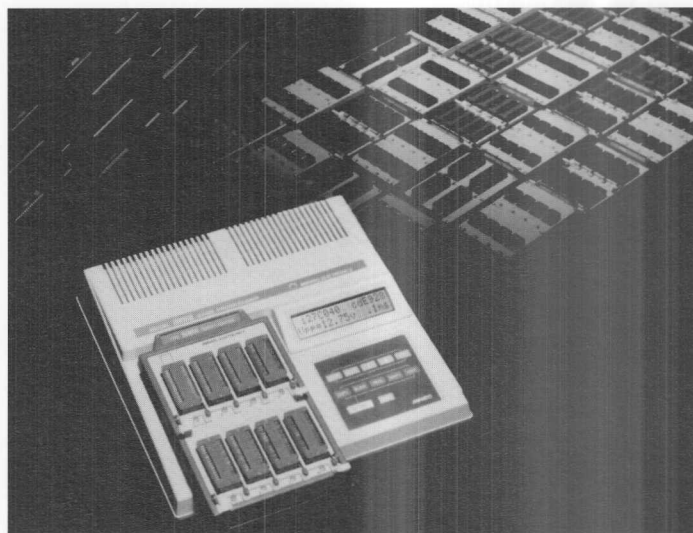
Model 1891/1892

Model 1891/1892 Compact Gang Microcontroller and EPROM Programmer

- ▶ Gang programming for MCS®96 family
- ▶ Up to eight sites on various modules
- ▶ High-speed and high-throughput programming
- ▶ DIP, SDIP, PLCC, QFP, and SQFP support
- ▶ Reliable performance
- ▶ Device registration by signature
- ▶ Serial port I/F on Model 1892 for IBM PC
- ▶ 13 standard file formats accepted
- ▶ Versatile built-in diagnostics
- ▶ EPROMs EEPROMs and OTPs support

Contact

Minato Electronics, Inc.
3628 Madison Avenue, Suite 5
North Highlands, CA 95660
Tel: (800) 576-6067 (in California);
(800) 576-6068 (Nationwide)
Fax: (916) 348-0926



Product Information

The Model 1891 and 1892 Compact Gang Programmers, equipped with high-speed programming capabilities, were developed to program the Intel MCS®96 family of microcontrollers as well as a wide range of other microcontrollers and EPROMs.

In keeping with the ever-changing demands of the programmer industry, our device support list and programming modules are constantly updated to support even the most current Intel microcontrollers. These programming modules handle up to eight sites per unit offering exceptional support for the heavy output demands of production.

Our support of package types includes DIP, SDIP, PLCC, QFP, and SQFP. In addition to microcontroller support, the 1891 and 1892 programmers can program EPROMs of 4 Mbits and 8 Mbits, respectively.

Eight separate diagnostic test programs provide for verification and adjustments. These are especially valuable on production lines where the 1891 and 1892 are used regularly to perform daily preventative maintenance. All sockets on the modules are equipped with independent power supplies and signal circuits ensuring reliable programming. Our Model 1891 and 1892 Programmers are qualified by many microcontroller and EPROM manufacturers.



MINATO ELECTRONICS

PSD-Gold/PSD-Silver

PSD-Gold/PSD-Silver Development System for PSD3XX/PSD3XXL Microcontroller Peripherals

- ▶ Complete set of IBM PC-based development tools
- ▶ Easy-to-use menu-driven commands
- ▶ MAPLE location editor selects PSD3XX configurations
- ▶ MAPPRO programs a PSD3XX device
- ▶ WS6000 MagicPro Programmer programs all WSI products
- ▶ MagicPro socket adapters accommodate all WSI packages

Contact

WSI

47280 Kato Road
Fremont, CA 94538Tel: (510) 656-5400 or (800) 832-6974;
(800) 562-6363 (in California)

Fax: (510) 657-8495

**Product Information**

The PSD-Gold (including the MagicPro Programmer) and PSD-Silver development tools provide design-in support when using a PSD3XX or PSD3XXL field-programmable microcontroller peripheral device. The menu-driven software enables you to quickly select the various PSD3XX/PSD3XXL configuration features and memory mapping capabilities required for the system under development. In addition, the tools are inexpensive and very easy to use.

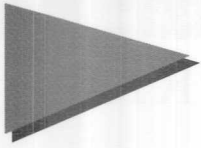
The hardware consists of the WS6000 MagicPro programmer that includes an IBM PC compatible plug-in board and remote socket adapters suitable for all WSI packages. The software consists of WISPER (the software environment shell), MAPLE (the location editor that configures the PSD device), and MAPPRO (the device programming software).

As a PSD-Gold or PSD-Silver customer, you receive a 12-month software update service and access to WSI's field applications engineers and application group experts for system design related issues. You also have access to a 24-hour electronic bulletin board for design assistance via dial-up modem.

Ordering Information

For literature, pricing, and availability, call or fax us to find the sales office nearest you.





Other Development Support Products

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RTXC™

Real-Time Executive in C

- ▶ Multitasking real-time kernel for the Intel 8051/80x96/80x86 families
- ▶ Deterministic design and implementation for low overhead and fast response
- ▶ Preemptive, time-sliced, and round-robin task scheduling with variable priority tasks
- ▶ Kernel services for task, memory, and resource management, intertask communication and synchronization, and timer support
- ▶ Synchronous or asynchronous intertask data movement via FIFO queues, mailboxes, and prioritized messages
- ▶ Fast, deterministic event synchronization with unique tri-state semaphore
- ▶ Partitioned memory management eliminates fragmentation
- ▶ Timeout capability on blocking actions
- ▶ Written primarily in ANSI C
- ▶ Configurable, ROMable, and user extensible
- ▶ System level debug facility, RTXbug

Product Information

RTXC is a multitasking real-time executive for use in embedded systems requiring a deterministic design with preemptive scheduling for true event-driven operation. Written primarily in ANSI C, RTXC is in wide use in telecommunications, factory automation and process control, office machines, medical and scientific instrumentation, avionics, and automotive applications. Since the introduction of RTXC in 1985, its success continues to be based on a robust library of services providing task, memory, and resource management; intertask communication and synchronization; and timer support. RTXC is available in three configurations; Basic Library, Advanced Library, or Extended Library. One-time site license fees are affordably low. There are no royalties, and all source code is included.

Host Supported

- RTXC is independent of any particular development platform.
- Supports most C compilers.
- RTXgen, the interactive system generation utility, runs on the development system. It is distributed with full C source so that it can be compiled to run on any development system with a native ANSI compatible C compiler.

Technical Support

- 550+ page user's manual
- Binding Manual specific to processor and C compiler
- Full source code included in standard distribution
- Direct factory support or support from experienced international distributors
- Initial warranty period with option to extend to annual maintenance
- Free updates and upgrades during warranty and maintenance periods
- Free telephone consultation during warranty or extended maintenance periods

Contact

A.T. Barrett & Associates
11501 Chimney Rock
Houston, TX 77035
Tel: (800) 525-4302 or (713) 728-9688
Fax: (713) 728-1049

A.T. BARRETT
+ASSOCIATES

9-Bit Solution

9-Bit Solution Microcontroller Network μ LAN

- ▶ Comprehensive μ LAN network
- ▶ 8051, 8096, and 80186 compatible
- ▶ Support for a full range of other processors
- ▶ Uses microcontroller's built-in serial port (up to 125 K baud)
- ▶ PC support using interface card
- ▶ Up to 250 nodes
- ▶ 16-bit CRC error checking with sequence numbers
- ▶ Low network overhead and low resource requirements
- ▶ Low cost/development time
- ▶ Complete source code included
- ▶ Comprehensive documentation

Contact

Cimetrics Technology
120 West State Street
Ithaca, NY 14850
Tel: (607) 273-5715
Fax: (607) 273-5712

CIMETRICS
TECHNOLOGY



Product Information

Cimetrics Technology's 9-Bit Solution provides innovative and cost-effective hardware and software for networking popular 8- and 16-bit microcontrollers. The 9-Bit Solution is a family of products that takes full advantage of the multiprocessor communication modes built into microcontrollers. The 9-Bit Solution allows simple and inexpensive development of master/slave multidrop embedded controller networks that are ideally suited for data acquisition and control applications.

The 9-Bit Solution family of products includes powerful master node software (PC or microcontroller), slave-node software, and a flexible RS-485 interface card for the PC. The fully documented 9-Bit Solution network software includes C-language libraries for the master node, assembly language software for several different slave microcontrollers, and clearly written sample programs. Our software saves time in the design and development of microcontroller networks by freeing you from the formidable task of writing network software.

Support

The 9-Bit Solution currently supports these microcontrollers:

- 8051 family
- 8096 family
- 80C186EB/EC
- 68HC11 family
- 68HC16 family
- Z180

Support for other microcontrollers will be developed upon request.

New Products

Cimetrics Technology is proud to introduce new products for 1993: the flexible ARCNET Solution family and the powerful Microcontroller Master software. The ARCNET Solution family includes interface cards that operate at up to 2.5 M baud using the popular peer-to-peer ARCNET protocol. The newest member of the 9-Bit Solution, the Microcontroller Master software, allows you to construct networks that contain only microcontrollers. Call us today for more information on these exciting new products.

MultiTask! GOFAST

MultiTask! Multitasking GOFAST Floating Point

- ▶ ROMable and re-entrant
- ▶ User-configurable
- ▶ Provides full source code in ANSI C
- ▶ Includes boot code, C startup, and configuration code
- ▶ Supports all C user code
- ▶ Includes serial stream I/O drivers
- ▶ Provides both pre-emptive scheduling and time-slicing
- ▶ Provides dynamic task management
- ▶ Provides resource management and event management
- ▶ Supports inter-task communication
- ▶ Provides dynamic memory management
- ▶ User's interrupt handlers can stimulate task switching
- ▶ Offers very low interrupt latency
- ▶ Includes conformance test and debugger task

Contact

U S Software
14215 NW Science Park Drive
Portland, Oregon 97229
Tel: (800) 356-7097 or (503) 641-8446
Fax: (503) 644-2413

Call or fax for additional information and free evaluation diskettes.

ViewTask!™

Multitasking Spreadsheet

ViewTask! is a PC-based program that enables you to design, develop, and test real-time multitasking applications. You can go from concept to C code framework with optimum task priorities already assigned. It helps you identify and eliminate task-timing conflicts. Start code checkout in a PC environment with ViewTask! libraries.

ProtoTask!™

PC Prototyping System

ProtoTask! is a PC-based tool that lets you develop, prototype, and test real-time multitasking applications. This task-level debugger works stand-alone or in conjunction with Microsoft Codeview or Borland Turbo Debugger.

MultiTask!™

C Multitasking Executives

Develop and implement real-time multitasking applications using over sixty powerful system calls. Get complete source code with ANSI C stream I/O including `sprintf` and `scanf`. ViewTask! and ProtoTask! compatibility complements this comprehensive solution.

GOFAST®

Floating-Point Math Products

Eliminate ROM and re-entrancy problems associated with multitasking and interrupts. Enhance application performance using high-speed algorithms that conform to IEEE 754 precision standards. GOFAST compiler libraries are available for Intel iC-86, Borland C, Microsoft C, Metaware High C, and Watcom C.

Host Systems Supported

Any system with cross-development capability

Support

Target processors supported:

- 8051
- 8085
- 80196
- 80x86
- i960
- 386/486
- Protected Mode



U S SOFTWARE®

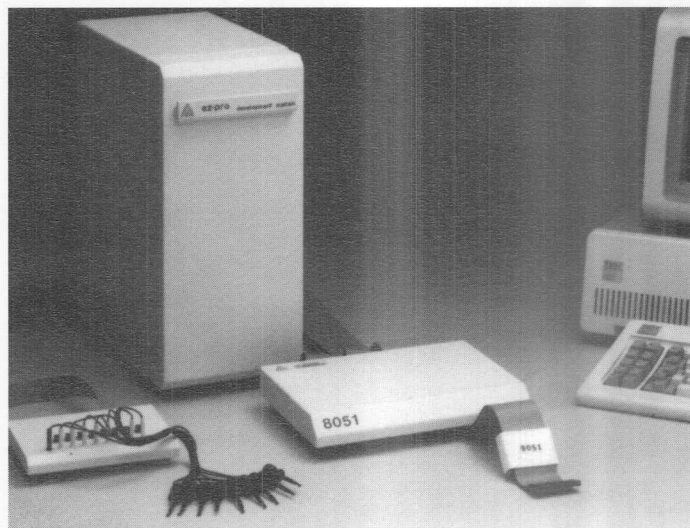
EZ-PRO

EZ-PRO Software
Development System

- ▶ MCS[®]-51, MCS[®]-96, and 186 architectures supported
- ▶ Most all variants supported including 80196KD
- ▶ Full-featured PC-based in-circuit emulator
- ▶ Low-cost ANSI C compilers
- ▶ 4 Kbits/channel trace memory
- ▶ Same user interface
- ▶ Integrated debug environment
- ▶ Easy to use
- ▶ Performance analyzer

Contact

Jeff Acampora
American Arium
14281 Chambers Road
Tustin, CA 92680
Tel: (714) 731-1661
Fax: (714) 731-6344

**Product Information**

EZ-PRO development systems are universal, and each supports a large repertoire of popular microprocessors. No matter which processor your system is configured for initially, you can work with a different one by simply purchasing the corresponding emulator kit. Your investment in an EZ-PRO development system is protected indefinitely.

All EZ-PRO emulators feature transparent real-time emulation with no wait states. All emulators support interrupts; most support them even while single-stepping. Built-in emulation memory can be mapped into memory space, so software can be debugged without a target.

ANSI C compilers are available for the MCS[®]-96, 186, and MCS[®]-51 families.

Ordering Information

- AA544-2 Development Station
- AA579-2 4 K Deep Trace
- AA572-80C51 8051 In-Circuit Emulator
- AA572-80196 8096/196 In-Circuit Emulator
- AA572-80C186 80186 In-Circuit Emulator
- AA554-8096 8096/196 C Compiler
- AA554-8051 8051 C Compiler

ML4400

ML4400 Series Logic Analyzer

- ▶ MCS®-51, MCS®-96, and 186 architectures supported
- ▶ Up to four microprocessors supported simultaneously
- ▶ Full software disassembly
- ▶ Corresponding timing analysis
- ▶ Up to 128 Kbits/channel trace memory
- ▶ Modular mainframe
- ▶ Portable
- ▶ Easy to use
- ▶ PC compatible floppy drive
- ▶ Up to 400 channels

Contact

Jeff Acampora
American Arium
14281 Chambers Road
Tustin, CA 92680
Tel: (714) 731-1661
Fax: (714) 731-6344

**Product Information**

The American Arium ML4400 Logic Analyzer is a modular, cost-effective instrument capable of performing traditional logic analyzer timing and glitch detection tasks as well as providing sophisticated disassembly for a wide variety of microprocessors. It can also provide software disassembly and high-speed timing analysis.

The mainframe can hold up to four capture cards at once. American Arium manufactures five different types of these cards. They range from 50 MHz to 200 MHz synchronous and 100 MHz to 1 GHz asynchronous. Memory depths range from 4 Kbits per channel to 128 K.

The ML4400 supports most microprocessors and microcontrollers. Intel products are supported from the 8085 through the Pentium™ processors. It supports full disassembly with all processors. In addition, a ROM emulator can be used for code download and patch.

Ordering Information

- ML4400S (Logic Analyzer Mainframe)
- UDD-001 (Disassembler for 8096/196)
- 8I-080 (8031/51 Micro Pod)
- AD-4100 (Adapter used with 8I-080)
- 16I-186 (80186/88 Micro Pod)

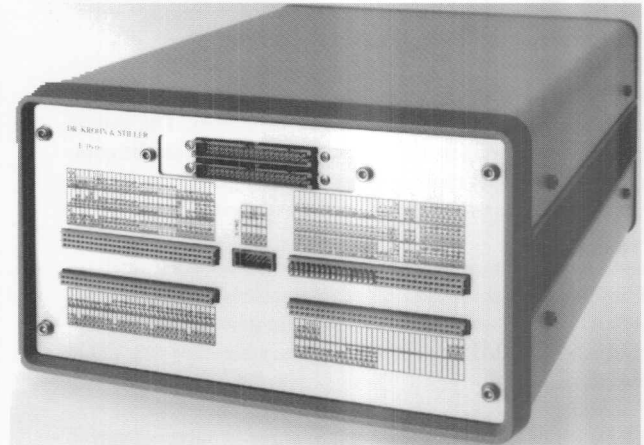
Emulator E8/E16/E32

Emulator E8/E16/E32 Universal Emulator for 8/16/32-Bit Processors

- ▶ One emulator base for all three families
- ▶ Emulation RAM size: 128 K to 32 MByte, mappable in 1 K steps
- ▶ Break on bus events, internal events, and clips events
- ▶ Trace capacity: 32 K or 128 K frames
- ▶ Trace recording of eight analog channels
- ▶ Trace recording of one RS-232 channel via UART
- ▶ Control signals available at front terminals
- ▶ Continuity checker
- ▶ Hosted on IBM PC, XT, AT, PS/2, and compatibles

Contact

Dr. Krohn & Stiller
Ottobrunner Str. 28,
D-8025 Unterhaching Germany
Tel: 49-89-610000-0
Fax: 49-89-610000-99



The Dr. Krohn & Stiller Emulator One Base for All Processor Families

With the E8/16/32 series, Dr. Krohn & Stiller is capable of supporting MCS[®]51, MCS[®]96, and 186 architectures. The different families are supported by specific family boards and PODs that carry the emulation processor.


There is one family board for the MCS[®]51 family and one for the 186-family. The MCS[®]96 family is supported by two family boards: one operates with standard technology and the second operates with bond-out technology. This universal tool is not only an in-circuit emulator, but also includes a logic analyzer, a clock generator, a pattern generator, and a continuity checker.

User Interface

The Dr. Krohn & Stiller emulators feature a colored, full-screen, windowed user interface. Easy operation is provided by a permanent tracking help window, pop-up windows, fill-in-the-blank command lines, and mouse and function-key support. All commands can be recorded in macros and executed by command files.

The windows offer information about processor status, memory contents with symbolic information and mnemonics, status of special function registers, break information, and more. Source-level debugging of object modules produced by assemblers and compilers is supported for a large number of compiler manufacturers. The source-level debugging is closely linked to the debug features, thus setting of breakpoints, single stepping, etc., are operated similarly. Symbolic references can be used to enhance design team productivity.

DR. KROHN & STILLER

(continued) 

Emulator E8/E16/E32

(continued)

Break Capabilities• *Hardware events*

The emulators feature sophisticated event-recognition capabilities, including recognition of internal events. The events can be used as triggers for breaks and trace, and can be combined to AND/OR combinations. Break registers can be edited for reuse and modification of event conditions.

• *Traps*

You can define four independent software breaks (traps). They are inserted in the flow of instructions and break only when they are executed. Traps are guarded against prefetches and halt the emulator at the statement at which the trap is set.

• *Fastbreaks*

The fastbreak feature allows you to enter emulator commands and achieve information from the target with a minimal intrusion while the target is running. The emulation will be interrupted for less than 25 µsec.

Trace Capabilities

With a 32K- to 128K-frame trace buffer, the emulator features a powerful analyzing tool for examining real-time history. Frames include addresses, op codes in hex and mnemonics, control lines, HLL statements, clips status, and timing information. Qualifiers can be specified as a filter to reduce the information to be recorded. Thus, only specified events enter the trace buffer. A timing analyzer helps evaluating times and bus cycles needed for parts of the program.

Examination of the trace does not influence emulation. It is not necessary to halt or interrupt emulation while examining execution history.

Dr. Krohn & Stiller is a manufacturer of emulators and universal development systems established in 1982. The processors and controllers supported are as follows:

- Siemens: 80c166; 80c167; 80512; 80513; 80515; 80517; 80535; 80537; 2084; 3084; 20160; 20560; 30160; 30161; 30162; 20c440; and SABc50x
- Zilog: Z280; Z180; and Z80
- National: HPC; COP800; and NSC800
- Hitachi: 64180; 647180; 64180S; 6301/03 R/V; and 6301/03 X/Y
- Rockwell: 6502/65c02
- Phillips: 8400; 80c451; 80c552; 80c592; 80c652; 80c851; and 80cL410
- Intel: 8048/49/50/35; 8080; 8085; 8086/88; 80c186/188; 80286; 8031; 8032; 8044; 8051; 8052; 80152; 80252; 80452; 8096: 8x96BH; 8x97BH/JC/JF; 8x95; 8x98, 8xC196KB/KC/KD/TB/KR/KQ/KT/JR/JQ/MC/MD/NT/NQ; 8xC194; and 8xC198
- Motorola: 6800; 6801/03; 6802; 6803E; 6805 E2,3/G2/P2,6/U2,3/R2,3,6; 68HC05: A6/B4,6,8/C2,3,4,5,8,9/D9,24/E0,1/F2,6/J1,2/L5,6,7,9,10/M4,9/N2,4/P1,4,7,8,9/T1,2,4,7,8; 68HC05 ASIC; 6809/6809E; 68HC11: A0,1,8/D3/E1,2,9/F1/G5,6,7/K4/L6/P2; 68000/08/10; 68001; 68020; 68302; 68331; 68332; and 68340
- NEC: 7500; V20,V30; V25,V35; V40,V50; and V33,V53
- Harris: 1802/04/06; and 68HC05
- OKI: 80154

DR. KROHN & STILLER

9350

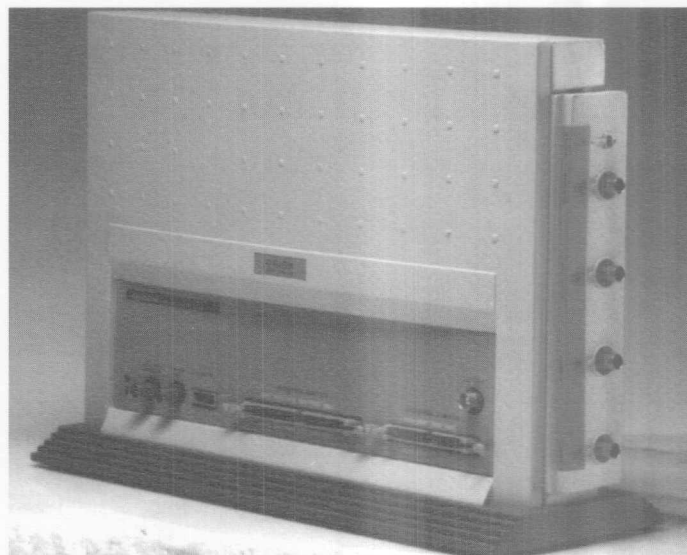
OmniLab 9000 Series Logic Analyzer / Digital Scope

- ▶ PC-based instrument integrates:
 - 48- or 96-channel logic analyzer
 - Dual-channel, 204 MS/sec digital scope
 - 24-bit digital pattern generator
 - Analog waveform generator
 - 500 MHz frequency counter
 - Microprocessor disassembly (optional)
- ▶ Microprocessor disassembly for MCS®-96, 186, and MCS®-51 architectures
- ▶ Mouse-driven graphical user interface
- ▶ Single screen, *time-aligned* displays between MPU disassembly, timing analysis, and analog waveforms
- ▶ Deep 16 K or 64 K trace memory
- ▶ Mixed A/D™ triggering uses digital *and* analog criteria for trace qualification
- ▶ Integrated instrumentation finds faults separate instruments can't
- ▶ Programmable, including optional IEEE-488 support

Contact

Orion Instruments, Inc.
180 Independence Drive
Menlo Park, CA 94025
Tel: (800) 729-7700 or (415) 327-8800
Ask for corporate sales
Fax: (415) 327-9881

ORION[®]
INSTRUMENTS



Product Information

The OmniLab 9000 series saves valuable debugging time by combining a logic analyzer and a digital storage oscilloscope into a single, integrated, PC-based test system. By providing simultaneous, *time-aligned* measurements of both digital and analog events, including microprocessor disassembly, you get a revealing, multifaceted view of system behavior. Together with a highly responsive, mouse-driven GUI, the OmniLab provides embedded system debugging capabilities not available with separate test instruments.

In addition to excellent data-acquisition capabilities, the OmniLab's analog and digital stimulus generators make it easy to simulate fault conditions and watch how the circuit reacts. Waveforms captured by the digital scope or logic analyzer can be stored, edited, and played back.

OmniLab's Mixed A/D™ triggering enables you to easily capture difficult mixed-mode problems and rare events such as noise spikes, dropouts, and race conditions.

The OmniLab is completely programmable. All instrument setups can be instantly recalled. And with optional Test Automation Software, you can edit in operator prompts, conditionals, and loops to create automated bench-top tests in a fraction of the time of typical IEEE-488 based test setups.

OmniLab is a complementary tool for Orion's line of emulator/analyzer products. See the listings for Orion's 8800 and UniLab 8620 for more info.

Processors Supported

All ROMless versions of the MCS®-96, MCS®-51, and 186 families.

Host Systems Supported

286 or higher PC compatibles

Ordering Information

Complete OmniLab 9000 systems start at \$8,900.
Available now.

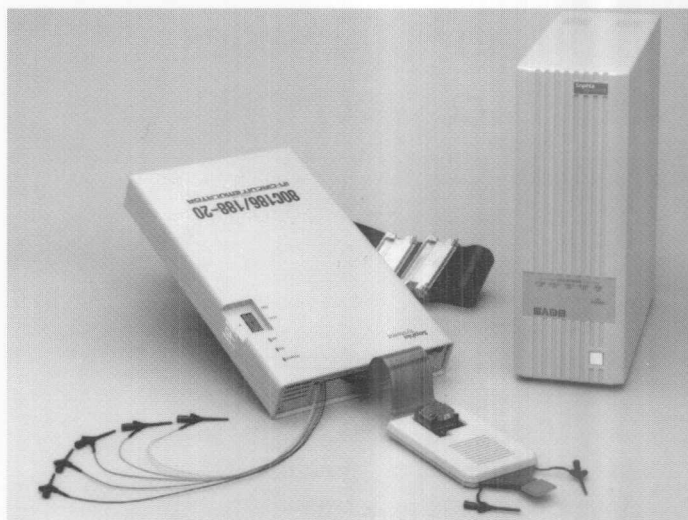
SA98

SA98 In-Circuit Emulator

- ▶ Transparent, real-time emulation with no added wait states
- ▶ Universal platform approach means minimal hardware additions when adding new processor support to emulation system
- ▶ Optional memory to 8 MB, mappable in 4 KB blocks
- ▶ Any combination of emulator and target memory can be specified
- ▶ Designate break, trigger, and trace points, and single step with symbolic and high-level language debuggers
- ▶ Proprietary high-speed parallel interface between the PC host and emulator or target
- ▶ External logic input and output lines for synchronization with logic analyzers, counters, or other test equipment

Contact

Sophia Systems and Technology
Sales Department
777 California Avenue
Palo Alto, CA 94304
Tel: (800) 824-9294 or (415) 493-6700



Product Information

The SA98 in-circuit emulator from Sophia Systems provides full emulation and analysis capabilities for designing, programming, integrating, and testing embedded systems. The small, light-weight system can be tailored to emulate 8-, 16-, and 32-bit micro-processor applications and supports more than 100 microprocessors. The SA98 is flexible, with 36 different probes that can be connected to the same universal chassis.

Hosted by an MS-DOS compatible computer, the SA98's real-time, transparent emulation provides full-speed, zero-wait-state operation. This occurs without stealing cycles or expending target resources. The SA98's memory is fast and large—64 KB for 8-bit processors and up to 8 MB for 16- and 32-bit processors—to more accurately match processor addressing capability. A high-speed parallel interface between the PC and the SA98 permits fast download to emulator and target memory. The emulator also is easily synchronized with test equipment, logic analyzers, or external signals.

Sophia's universal platform approach means that all 36 probes are compatible with the SA98 emulation host and the PC interface card. When required by a particular system, the trace control card and additional memory cards are also universal.

Ordering Information

Contact Sophia Systems and Technology at (800) 824-9294 or (415) 493-6700.

Sophia
systems
and Technology

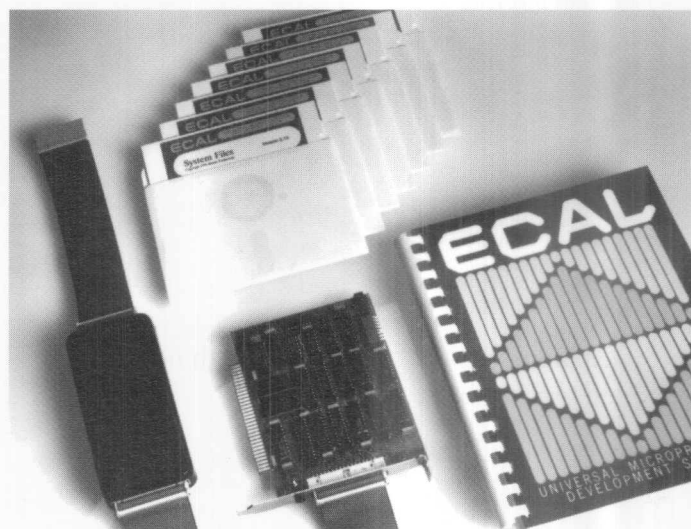
ECAL

ECAL Universal Assembly Language Development System 05-0200-010

- ▶ Alternative to Real-Time Emulator
- ▶ Support for 8051, 8096, and 186
- ▶ Support for 170+ additional processors
- ▶ User control of syntax and instructions
- ▶ Extremely fast assembly—2 Kbytes/sec
- ▶ Integrated split-screen editor or command-line assembly supported
- ▶ Integrated linker/loader
- ▶ Instruction trace and I/O windows
- ▶ Monitor and RS-232 com. windows
- ▶ Single micro processor versions available
- ▶ Optional EPROM emulator and programmer
- ▶ Source-level debugger

Contact

Vail Silicon Tools
692-A S. Military Trail
Deerfield Beach, FL 33442
Tel: (305) 570-5580
Fax: (305) 428-1811

**Product Information**

ECAL is a complete assembly-language development system that provides all the tools needed to assemble, link, load, run, and debug your project for over 170 processors. By using user-editable control files, the ECAL macroassembler in its full configuration can handle 4-, 8-, 16-, or 32-bit microprocessors with unsurpassed speed and consistency.

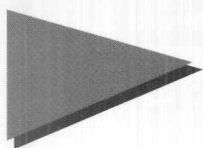
Using the familiar DOS-based text windows, you can edit, assemble, set breakpoints, trace execution, watch registers and I/O, and communicate with your target's serial port in separate closable windows. If you prefer to use other tools, with a few keystrokes, ECAL will incorporate your previous work into its consistent and intuitive environment.

The free ECAL evaluation program features all of the ECAL tools for all of the supported micros, giving you a true sampling of ECAL development cycle (source and object length limited).

VAIL Silicon Tools sells and supports ECAL and can bundle ECAL with additional hardware and software to satisfy your need for economical project development tools.

Ordering Information

- 05-0200-010 ECAL OAS
- 05-0200-020 ECAL with EPROM Emulator
- 05-0200-XXX ECAL Single Processor



Training and Consulting Services

Annapolis Micro Systems, Inc.
ComputerVision
ComputerVision

Engineering Design Services	130
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MCS®-96 Microcontroller Family Workshops	132

Engineering Design Services

Intel Microcontroller Based Product Development

- ▶ Experts in Intel microcontroller-based design
- ▶ Responsive to tight schedule requirements
- ▶ Cost-effective development cycle
- ▶ Design for low-cost per unit
- ▶ Design for manufacturability
- ▶ Flexible, cooperative design teams
- ▶ Annapolis Micro Systems, Inc., provides:
 - Hardware design
 - Custom board design
 - Digital, analog, and mixed-signal design
 - ASIC design
 - Xilinx™ field programmable gate array design
 - Software design
 - Embedded microprocessor software
 - Drivers for various operating systems including DOS, OS/2, and Windows
 - Systems software
 - Application programs
 - System design
 - PC-based
 - PS/2-based
 - Stand-alone
 - Standard bus
 - VME bus
 - Proprietary buses

Contact

Annapolis Micro Systems, Inc.
190 Admiral Cochrane Drive, Suite 130
Annapolis, MD 21401-7386
Tel: (410) 841-2514
Fax: (410) 841-2518



In 1982, Annapolis Micro Systems, Inc., began designing Intel microcontrollers into a variety of products produced for the commercial marketplace. Our intimate knowledge of the 8051, 80186, 286, 386, 486, and the 8096/196 families of microcontrollers in total product development allows us to provide expert input from feasibility study through production. Our work in the commercial arena has kept us sensitive to stringent time schedules and cost constraints.

Annapolis Micro Systems, Inc., is a complete resource for product development. Our in-house expertise includes custom hardware, software, and system design as well as PC board layout and surface mount/through hole prototype and production manufacturing.

We are proud of the cooperative, long-term relationships we have established with customers worldwide.

We have designed the following using Intel Microcontrollers:

Emulator for the 8096/196 family, Emulator for the 80C196MC microcontroller, Plug-in development board for the 8096/196 family, Programmer for the 8096/196 family, Computer input devices, Data acquisition boards, TDD devices, Point of sale terminal, LAN boards, Communications products, Display technology, Graphics controllers, Motor controllers, Disk controllers, Medical instrumentation, Image recognition system, Liquid level measurement system, Modems, Telephone line analysis instrument, Mass storage unit, digitizers...



Annapolis Micro Systems, Inc.

[ED3030] 8051 Microcontroller Family Workshop

- ▶ Learn the basic 8051 features, the differences among 8051 family members, and basic support products
- ▶ Write programs using the ASM51 instruction set that access code, data, special function registers, and bit-address spaces of the 8051 family
- ▶ Write programs using on-chip hardware peripherals to interface the 8051 to external hardware
- ▶ Learn the advanced features of the 8051 family development tools
- ▶ Use the advanced features added to 8051 family proliferations

Contact

Customer Education
#11 Oak Park Drive
Bedford, MA 01730
Tel: (800) 234-8806

Workshop Information

Use a PC-based workstation and Intel development tools to write, assemble, and debug programs using the 8051 instruction set. You'll also configure the on-chip peripherals of the 8051 family and interface the 8051 to external hardware.

Who Will Benefit

Engineers and programmers who program and work with the 8051 family of microcontrollers.

Prerequisites

Familiarity with binary and hexadecimal number systems and digital logic. Experience with assembly language programming or proficiency with high-level language programming are recommended for this class.

Length

5 days

Price

\$1,195



COMPUTERVISION

Customer Education

Intel's Preferred North American Training Provider

[ED3040] MCS[®]-96 BH/KB/KC/KD and MCS[®]-96 KR/JR/NT/NQ Family Workshops

- ▶ MCS[®]-96 BH/KB/KC/KD family course:
 - ASM-96 instructions that cause the pulse width modulator (PWM) output of the microcontrollers to perform according to a given specification
 - Programming the analog-to-digital (A-D) converter
 - Writing, executing, and debugging programs that utilize the high-speed output (HSO) and high-speed input (HSI) units of the microcontrollers
 - Writing programs that implement the branching or looping constructs using the appropriate ASM-96 branching instructions
 - Linking software and share data using RL96
 - Calculating the timing improvement realized by using the Peripheral Transaction Server (PTS) in an 80C196KC/KD design
- ▶ MCS[®]-96 KR/JR/NT/NQ family course:
 - Processor architecture
 - MCS[®]-96 assembly language and using ASM-96
 - Call mechanism including iC-96 parameter passing protocol
 - Analog-to-digital converter
 - Serial port (UART)
 - Interrupts

- Hardware requirements for single chip use
- Programming and using I/O ports
- Using external memory and I/O with up to 1-MB addressing for 80C196NT
- Using Event Processor Array (EPA) for PWM, high-speed I/O and timing

Workshop Information

Learn the architecture of the MCS[®]-96 family of microcontrollers and the development tools (VLSICE96 and ICE196PC) available for the product family. Hands-on laboratory sessions allow you to use the DOS-based Intel development tools. The course covers the 8X96BH, 8XC196KB, 8XC196KC, and 8XC196KD. While the architecture and programming are similar, the peripheral set and I/O structure are different.

Who Will Benefit

Engineers and programmers preparing to design a system based on one of the MCS[®]-96 family products, implement an MCS[®]-96 design, or support or maintain an MCS[®]-96 product.

Prerequisites

Experience with binary and hex number systems, digital logic, and assembly language programming (or proficiency with high-level language programming) is required.

Length

5 days per course

Price

\$1,195 per course

Contact

Customer Education
#11 Oak Park Drive
Bedford, MA 01730

For more information about Intel architecture courses, please call Customer Education Registration at (800) 234-8806.



COMPUTERVISION

Customer Education

Intel's Preferred North American Training Provider

Adapters & Accessories

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